

Show Starts Race for Sales

First Quarter Output May Exceed '34 by 20 Per Cent

by Don Blanchard,
Editor, Automotive Industries

Spurred by a favorite reception of the new models at the New York Show, the 1935 race for registrations got under way this week with the industry anticipating that the uptrend in sales will be maintained.

Despite the quite general belief that the year will bring a larger volume, automotive executives at the show were shy of predictions even of what their own output would be in the first quarter. However, practically all major manufacturers will be in a position to produce at capacity early in February. As a result, it now appears probable that output in the first three months will exceed the same period in 1934 by a substantial margin—perhaps by 20 per cent or more which would put production in the quarter above the 900,000 mark.

Now that all models have been priced, it is clear that they average somewhat higher than last year, and on a number of lines delivered prices will be increased further by increases in handling charges, accessory discounts, etc. However, the increases are small and do not compare with the rise in direct costs which probably are 15 to 20 per cent higher than a year ago.

What trend, if any, prices will show as the year progresses, is an enigma. In many cases, there is no doubt that at present prices a substantial increase in volume is essential to profits and in general profit margins are exceedingly narrow. Consequently the industry may be expected to offer strong resistance to downward changes in price which situation argues for a relatively stable price structure during the year. Much depends obviously on sales. If they show a strong upward trend, the urge to re-

(Turn to page 40, please)

AMA Opposes Code Price, Production Controls in Letter to Williams of NIRB

Opposition to all code price fixing, price maintenance and production control provisions, is voiced by the Automobile Manufacturers Association in a letter to S. Clay

Chrysler Workers to Vote

Nominating elections for candidates for collective bargaining representatives in the Dodge forge plant, Lynch Road truck plant and the Amplex Division of the Chrysler Corp. are scheduled for Jan. 15. The final elections will be held Jan. 22. The nominating election at the Highland Park plant of the Chrysler organization will be held Jan. 18 and the final voting will take place Jan. 29.

New Car Registrations Up 47% in Dec. for 10 States

New passenger car registration returns from 10 states for the month of December show 10,376 units registered as against 7060 for December, 1933, an increase of approximately 47 per cent. These 10 states are Delaware, Kansas, North Carolina, North Dakota, West Virginia, Georgia, Minnesota, Maryland, South Dakota and Wisconsin.



"The activity of the automobile industry should certainly bring back prosperity to America" said Mayor LaGuardia of New York, officially opening the N. Y. Show. Byron Foy, DeSoto president, is at the right.

Williams, chairman of the National Industrial Recovery Board, filed this week in connection with the hearings NRA is conducting on code price and production controls.

Although no statement amplifying the letter has been made, it is felt quite widely that the car makers had in mind particularly restrictive provisions tending to raise prices in codes governing industries supplying the automobile factories. Moreover, in view of the fact that car company policy on the dealer code has been one of neutrality and since a number of leading manufacturers have advocated strict compliance with the code on the part of their dealers, it is felt that the letter is not a criticism of what dealers have been doing or may wish to do in fixing in used car prices.

Nevertheless the opposition to price maintenance voiced by the manufacturers is arousing some concern in dealer circles. The dealer code makes it unfair competition to sell new cars, parts and accessories below

(Turn to page 41, please)

Turner Tells SAE Diners of London to Melbourne Flight; Elections Announced

The romantic and thrilling story told by Col. Roscoe Turner of his flight from London to Melbourne in the recent race in which his plane took second place, and motion pictures of the country the racers traversed, were the high spots of the annual banquet of the Society of Automotive Engineers held in New York on Monday of show week. The banquet, which marked the society's thirtieth anniversary, was attended by approximately 900, the largest crowd in recent years.

The results of the letter-ballot announced at the dinner showed that William B. Stout had been elected president for 1935. Other new officers elected are given in the accompanying box. No vice-president for the transportation and maintenance activity was elected due to the fact that F. C. Patton, who received the majority vote, withdrew as a candidate after the ballots had been mailed out. L. V. Newton, 1934 vice-president in charge of this activity, will continue until an election can be held to fill the vacancy.

By action of the Council, it was announced at the dinner, all past-presidents of the society, at the expiration of their ex-officio terms on the Council, will become life members of the society automatically. The new policy also applies to all living past-presidents and the following past-presidents were awarded life memberships: T. J. Fay, 1908; Howard E. Coffin, 1910; H. W. Alden, 1912 and 1923; Howard Marmon, 1913; George W. Dunham, 1917; C. F. Kettering, 1918; J. G. Vincent, 1920; David Beecroft, 1921; B. B. Bachman, 1922; H. M. Crane, 1924; H. L. Horning, 1925; T. J. Little, Jr., 1926; J. H. Hunt, 1927; W. G. Wall, 1928; W. R. Strickland, 1929; E. P. Warner, 1930; Vincent Bendix, 1931, and A. J. Scaife, 1932.

Built-in Jack Systems Exhibited at N. Y. Show

Two designs of built-in jacking systems were exhibited at the New York show. One was a power-operated installation developed by Marlowe Devices, Inc., Brooklyn, N. Y., while the other, the product of Ryerson & Haynes, Inc., Jackson, Mich., was manually operated. The latter company also exhibited a new portable bumper jack.

Chandler Heads New Carburetor Company

A new organization known as the Chandler-Groves Company has been organized for the engineering and manufacture of automotive and aircraft carburetors and other products. The plant is located at 5980 Vancouver Ave., Detroit.

Officers of the company are: M. E. Chandler, president, formerly vice president and chief engineer of Bendix-

Stromberg Co., South Bend, Ind., and W. B. Groves, vice-president handling sales, formerly in charge of manufacturers' sales of Bendix-Stromberg Co. in Detroit.

Associated with Mr. Chandler and Mr. Groves will be: Scott F. Hunt, Elmer Olson, Milton Kittler and F. A. Barford, all former members of the engineering department of Bendix-Stromberg Co. under Mr. Chandler; and M. A. Trisler and R. L. Nye, formerly connected with the Detroit office of Bendix-Stromberg.

The company is associated with the Holley interests.

New S.A.E. Officers

President—William B. Stout.
Treasurer—David Beecroft, Bendix Corp.
Vice Presidents:
Aircraft—C. H. Chatfield, United Aircraft.
Aircraft-Engine—Philip B. Taylor, Wright Aeronautical Corp.
Diesel-Engine—C. L. Cummins, Cummins Engine Co.
Fuels & Lubricants—D. P. Barnard, Standard Oil (Ind.).
Passenger Car—L. P. Kalb, Continental Motors.
Passenger Car Body—C. O. Richards, Cadillac Motor Car Corp.
Production—V. P. Rumley, Hudson Motor Car Co.
Transportation & Maintenance—Candidate withdrew, no election.
Truck, Bus, Railcar—C. O. Guernsey, J. G. Brill Co.
Councilors—Term of 1935-1936:
F. C. Horner, General Motors.
H. T. Woolson, Chrysler Corp.
Austin M. Wolf, Consulting Engineer.

Chevrolet '35 Truck Chassis Design Little Altered, N. Y. Show Reveals

by Athel F. Denham

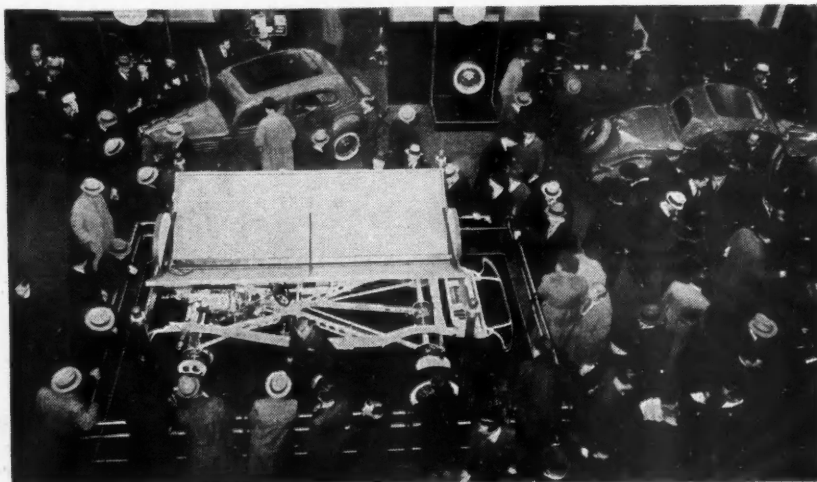
Detroit Editor, Automotive Industries

The 1935 truck chassis of the Chevrolet Motor Company on exhibit at Grand Central Palace this week shows no major departures from previous design. Aside from the commercial chassis which, of course, follows the developments in the passenger car chassis, the truck models carry major refinements primarily in engines, brakes, and front springs.

Engine changes follow the developments for the 1935 Master engine, such features as jet lubrication of connecting-rod bearings at high speeds, having been added. Power output, etc., remains unchanged, on the other hand.

Probably the most important development is in connection with the braking system. Capacity has been materially increased with a contact area of 348 sq. in. as against 267 sq. in. last year. Drums are larger in diameter, 14 in., and are wider, 2 in. at the front and 3 in. at the rear. Linings are thicker ($\frac{1}{4}$ in.) and have a higher coefficient of friction so that stopping ability is increased in even greater proportion than contact area. At the same time the linkage has been changed to provide a lighter pedal pressure, while pedal travel has been increased to compensate.

Front springs have heavier main leaves



The Ford Exhibit at the New York Show. This is the first display of Ford cars at a New York Show in 25 years



Chevrolet's exhibit before the show opened Saturday morning

and somewhat higher rates of deflection. The second leaf has been extended rearward beyond the shackle eye, without wrapping the eye, to provide a further safety precaution against effect of possible main leaf breakage. If the main leaf should break, the load would be taken by the second leaf. The frame bracket for the rear support of the front springs is also materially sturdier.

In the steering mechanism self adjusting, tapered bearings have been adopted

in the tie rod ends, and the drag link is now of tubular design.

Universal joints have been improved in detail, have bronze bushings and require less lubrication attention than formerly, it is stated by Chevrolet representatives at the show.

Torque tubes at the rear flanges have been provided with ribs for increased torque load capacity. Clutch and transmission are virtually unchanged from last year.

Organizations Lose Out in Chevrolet Election as Individuals Win at Polls

The results of the A.L.B. sponsored election for collective bargaining representatives in the Chevrolet forge, spring and bumper division duplicated the trend observed in the Cadillac elections, that the workers prefer to be represented by individuals rather than organizations in bargaining matters. Of a valid voting force of 3132 employees, 2781 cast ballots, and nearly two-thirds of the potential total bore no organization affiliation preferences.

Despite claims of majority membership among the workers in this Chevrolet division the A. F. of L. union failed to poll as many votes as the Chevrolet Employees Association. The works organization received 328 votes to 209 for the A. F. of L., while the total of ballots cast with no marked affiliation was 1995. Of the 2781 votes 46 were blank and 162 voided. The MESA received 39 votes; the Auto Workers Union (Communist) and the I. W. W. received one each.

The A.L.B. divided the plant into 14 voting districts in the same manner as the Cadillac plant was split up. The election last Friday (Jan. 4) was the primary to name nominees. Two candidates were nominated from each dis-

trict. The final election was held yesterday, but the results of this voting were not available at press time.

The A.L.B. made only minor changes in the rules for the election from those promulgated for the Cadillac election held two weeks ago.

New Cars Built To Fit Riders

Kettering Sees Practice as Most Important 1935 Auto Engineering Trend

Designing cars around the driver and riders rather than trying to fit drivers and riders into cars designed on the basis of engineering considerations alone, was characterized as the most important single development in automobile design during the past year by Charles F. Kettering, vice-president, General Motors Corporation, Monday, at the first of what are expected to be annual meetings staged by the corporation for technical editors.

Mr. Kettering pointed out that in the past most cars were designed by fitting a body to a predetermined chassis layout. This was followed more recently by coincidental designs of body and chassis but largely for the purpose of obtaining better engineering coordination of the various units composing the complete vehicle. Allocation of engines, axles, etc., however, still determined the general car design, and particularly the location of occupants in the car.

Only recently, Mr. Kettering said, has the entire viewpoint been changed. Today, he said, cars are beginning to be built around the rider, giving him first consideration as to room, riding comfort, etc., and letting those determinations govern allocation of chassis units.

Following Mr. Kettering's talk the meeting was opened for questions. In reply to a question regarding the importance of streamlining Mr. Kettering reiterated his previously expressed views as to the difficulties of determining what should constitute a streamline shape for a land vehicle. He pointed out that probably the best streamlined land animal was the turtle. "And," he added, "the turtle is not particularly noted for its high speed qualities."



Throngs in the Plymouth exhibit shortly after the New York Show opened

Charge 7a Drawn to Keep Workers, Employers Apart at Houde Hearing

Charges that Section 7a of the Recovery Act was drawn to keep employers and employees apart and give the American Federation of Labor an opportunity to build up its membership through coercion of workers were made by Edward W. Hamilton, Buffalo attorney representing a group of Houde Engineering Corp. employees who seek to intervene in the suit of the United States Government against the Houde organization.

The charges were made at a hearing this week in the United States District Court before Judge John H. Knight in Buffalo, when arguments on the brief of the Houde company requesting an amended bill of complaint in the government's suit were heard. The Houde corporation was represented by the Detroit law firm of Beaumont, Smith and Harris. Robert B. Watts, Washington, D. C., special counsel for the National Labor Relations Board, represented the government, and in his argument confined himself principally to the contention that the present bill adequately covers the situation.

At the same time the arguments were heard on the petitions of Joseph W. Dambach, et. al., and the Houde Welfare and Athletic Association, both of which, to protect their collective and individual rights, seek to be made a party to the government's suit. Mr. Hamilton appeared to represent these parties and presented lengthy arguments in support of the petitions of intervention. He dwelt particularly on Section 7a of the Recovery Act, pointing out that while employees, under terms of the section are to be free from the interference, restraint or coercion of employers, it is not stipulated that they also shall be free of the coercion of organized labor organizations or their agents.

The petitions were subjected to determined attack by George L. Grobe, U. S. Attorney for the Western New York District,

who asserted that the petitioners were not and could not be parties to the action on the main issue; could not participate in any manner except as their participation might be determined by the government, and furthermore that the petitioners were in no way involved in the main issue and had nothing more at stake than thousands of other workers throughout the country.

A surprise was sprung a few moments before court adjourned when a third petition of intervention, dated January 5, was served in behalf of another employee of Houde, William P. McGahan, who became an employee after the election. The petition was filed by Arthur R. Moore, attorney for McGahan, under Equity Rule No. 37.

The court ordered briefs supporting the arguments to be filed on or before January 14.

The Houde Engineering Corporation is now employing about 1650 men working in three shifts. Several men have been added to the pay roll in recent weeks.

Lincoln 1935 Prices

	1935	1934
7-passenger touring	\$4,200	\$4,200
*5-passenger coupe	4,200	3,400
*5-passenger 2-window sedan	4,300
*5-passenger 3-window sedan	4,300
7-passenger sedan	4,600	4,500
7-passenger Limousine	4,700	4,700
*LeBaron 2-passenger coupe (luggage compartment in rear deck)	4,600	3,250
*LeBaron convertible roadster (with rumble seat)	4,600	3,400
*LeBaron convertible sedan phaeton	5,000	3,400
LeBaron convertible sedan (with partition)	5,500	5,600
*Brunn convertible victoria	5,500
Brunn cabriolet (semi-collapsible)	6,700
Brunn cabriolet (non-collapsible)	6,600
Brunn brougham	6,700	6,800
Willoughby limousine	5,700	5,600
Willoughby sport sedan	6,800
Judkins 2-window berline	5,500	5,400
Judkins 3-window berline	5,500	5,400
Judkins sedan limousine	5,700	5,700
*Chassis	2,700
Chassis	2,900

*Denotes 136-in. wheelbase. All others, 145-in. wheelbase.

P. M. Heldt Exhibits as Publisher at Show

One of the newcomers among the exhibitors at the New York show was one of the industry's real old-timers—P. M. Heldt, engineering editor of *Automotive Industries* and internationally recognized technical authority. Mr. Heldt exhibited as a publisher his famous group of books on automotive engineering.

Borg-Warner Subsidiaries Now Corporation Divisions

With the transfers of titles last week four Detroit plants which have been operating as subsidiaries of the Borg-Warner Corp. have become divisions of the parent organization. These companies were wholly owned by the Borg-Warner organization.

They are the Detroit Vapor Stove Co., the Detroit Gear and Machine Co., the Norge Corp., and the Long Manufacturing Co. In addition similar transfers of properties of other subsidiaries took place elsewhere involving the Mechanics Universal Joint Co., Borg and Beck, Ingersoll Steel and Disc Co., Warner Gear Co. and Rockford Drilling Machine Co. The purpose of the change was to simplify office accounting, it was said.

Packard "120" Prices

2-p. Coupe	\$ 980
2-4-p. Coupe	1,020
5-p. Touring Coupe	1,025
5-p. Standard Sedan	1,060
2-4-p. Convertible Coupe	1,070
5-p. Club Sedan	1,085
5-p. Touring Sedan	1,095

Touring models have built trunks and concealed tire mounting at rear.

Hupmobile Prices

Series 518 (New) 1935	
Sedan	\$795
Deluxe Sedan	835
Series 521	
Coupe	1195 No change
Sedan	1095 "
Victoria	1195 "
Series 527	
Coupe	1395 No change
Sedan	1395 "
Victoria	1395 "

Willys Prices

4-d. sedan	New \$415	Old \$525
Panel delivery	415	425
Coupe	395	395



"Let's Look at the Record"

Former Governor Alfred E. Smith inspects a 1935 DeSoto at the New York Show as the guest of Byron Foy, DeSoto president. The man at the left is William F. Kenny.

\$35,000,000 Spent by GM on 1935 New Models

Sloan Says Ultimate Ride Obtainable Only by Using Independent Suspensions

GM's 1935 new model program involved expenditures of approximately \$35,000,000 for new machinery, tools and plant, according to a statement by Alfred P. Sloan, Jr., president of the corporation, issued coincident with the opening of the New York Show.

In his discussion of the new models themselves, after emphasizing the significance of the new "turret" tops on a number of GM cars, Mr. Sloan referred to the general tendency to improve riding. "By moving the engine forward and effecting better distribution of weight, as illustrated in many 1934 cars, motor car rides have been improving . . .", he said. "But the ultimate in a better ride can only be obtained by insuring independent action of each wheel. . . ."

Repeating previous statements on streamlining, Mr. Sloan said: "The popular belief is, that there is a distinct saving in the operating cost of a motor car embodying certain aerodynamic features. The broadest possible gain that can be expected is a somewhat higher top speed, or perhaps at top speed an inconsequential saving in fuel, all other circumstances being the same. Except for a negligible part of motor car travel the contribution of streamlining is definitely limited to the question of styling."

Alma M. Bendix

Mrs. Alma M. Bendix, mother of Vincent Bendix, president Bendix Products Corporation, died Monday in Pasadena, Calif., after an illness of two years. Mrs. Bendix was the widow of Rev. John Bendix, who was killed in an automobile accident 10 years ago.

Mrs. Bendix was born in Sweden, but spent the greater part of her life in the United States. She was past 70 years of age. Surviving her besides Vincent Bendix, is another son, Ernest O. Bendix, Chicago; and a daughter, Miss Esther Bendix, who lived with her mother in Pasadena.

"Satevpost" Cover Reminds of Photo by Barney Roos

The front cover on the current issue of the *Saturday Evening Post* is occasioning some speculation in automotive circles as to whether D. G. "Barney" Roos, 1934 SAE president and Stude-

baker chief engineer, shouldn't be credited with an assist. Comparison of the cover with Barney's famous fire engine photograph (*Automotive Industries*, Feb. 17, 1934) reveals a general similarity in composition.

Mock Named Vice President Of Bendix Products Corp.

The appointment of Frank C. Mock, as vice president in charge of carburetor engineering of the Bendix Products Corporation has been announced by Vincent Bendix.

Mr. Mock, a veteran of the automotive industry, is a recognized authority on



Frank C. Mock

the basic laws of fuel and air flow in automobile and aviation carburetors. He has been associated with the development of the Bendix Stromberg Carburetor continuously since 1912.

Mr. Mock became associated with the automotive industry in 1903 as a draftsman with the old F. B. Stearns Company and later he joined the engineering staff of the Royal Tourist Motor Car Company, the Stoddard Dayton Company and the Thos. E. Jeffery Company.

Mr. Mock has been a member of the Society of Automotive Engineers since its organization. He was the representative of automotive engineering in the Industrial and Engineering Councils of the National Academy of Sciences. He is a scientific member of the Institute of the Aeronautical Sciences. Also, he is a member of the Cooperative Fuel Research Committee of the S.A.E. and the American Petroleum Institute.

Consumer Board Rakes NRA Policies in Memo

NRA policies are the subject of a sizzling attack in a report by one of its units, the Consumers' Advisory Board, which was released Jan. 5. The Board recommends that sweeping changes be made at once which would have the effect of reducing the majority of codes to standard governing hours, wages, child labor, collective bargaining and fair trade practices. It is urged that Congress in revising the NRA do so along the lines suggested. It is charged that the original purposes of the law, "to promote the fullest possible utilization of the present productive capacity of industries, to avoid undue restriction of production . . . to increase the consumption of industrial and agricultural products . . . and to conserve natural resources" have been lost sight of entirely. Charges of price fixing, and monopoly through codification are freely made throughout the report. It is contended if the Recovery act has unduly "restricted production, prevented the fullest possible utilization of productive capacity or failed to increase consumption, it is because the pressure of special interests for individual advantage has diverted the course of the act from that which Congress intended it to follow." Increased government control is urged and return to wide open competition, with a certain degree of control, is strongly recommended.

Chevrolet Knees Cost \$20 Extra

Prices on Chevrolet Master models, reported in *Automotive Industries* last week as unchanged from last year, were for cars equipped with conventional semi-elliptic springs at the front. Equipped with knee action at the front, the list prices are \$20 higher.

Edmund H. Carpenter

Edmund H. Carpenter, one-time Canadian sales manager of the Hudson Motor Car Co., died Sunday morning. He had been associated with the Hudson Motor Car Co. for 18 years, more recently as a dealer. Surviving are his wife, Gretchen H.; a son, Edmund, Jr., and a daughter, Betty Jane.

Robert O. Patten

Robert O. Patten, one time sales manager for the Pierce-Arrow Motor Car Company truck division, and more recently in the investment business, in Buffalo, died Jan. 1 as the result of a fall from a hotel window.

GM 1934 Sales Make Gains Ranging From 22% to 42%

	Sales to U. S. Consumers	Sales to U. S. Dealers	World Sales to Dealers
12 mos., '34	927,493	959,494	1,204,447
12 mos., '33	755,778	729,201	869,035
Dec., '34	41,530	28,344	41,594
Nov., '34	62,752	39,048	61,037
Dec., '33	11,951	11,191	21,295

Automotive Executives P



Roy H. Faulkner, Auburn president, discusses a new model with Norman G. Shidle

A group of Buick executives. From left to right they are H. J. C. Miller, assistant general sales manager for the east; F. A. Bower, chief engineer; H. Osterman, Stockholm, Sweden, one of Buick's oldest dealers; Harlow H. Curtice, Buick president; W. F. Hufstader, vice-president and sales manager



Paul Hoffman, Studebaker president, gets a 'phone call

W. C. Cowling, Ford sales manager, standing beside one of the new Fords



C. W. Matheson, Graham-Paige vice-president in charge of distribution (at right)



R. H. Israel, eastern sales manager for Nash (left), and C. H. Bliss (right), Nash vice-president and director of sales



Some Oldsmobile officials look around. From left to right they are R. M. W. Shaw, assistant general sales manager; D. E. Ralston, general sales manager; Harold T. Youngren, chief engineer; C. L. McCuen, president



Pre-view New York Show



F. W. Williams, in charge of Chevrolet assembly plants, left, and M. E. Coyle, right, Chevrolet president and general manager.

Group of Chevrolet executives: Left to right they are F. W. Williams, general superintendent of assembly plants; Elery Wright, New York manager; H. B. Hatch, assistant sales manager for the eastern territory; W. E. Holler, general sales manager, and P. R. Letts



J. W. Frazer (left), Chrysler Eastern Sales Manager, and Arthur E. Corbin, Simons-Stewart Co., N. Y. Distributor



W. R. Tracy, Hudson general sales manager



Harry G. Mook, seated, Plymouth vice-president, discusses the show with Chilton Co. editors. Athel F. Denham, Detroit editor, with back to camera; Don Blanchard, editor of Automotive Industries, at left on steps, and Leon F. Banigan, editor of Automobile Trade Journal, at right



Alfred Reeves, (right), show manager and vice-president of Automobile Manufacturers Association

Hydeborn Co. Objects to W-O Reorganization Plan

The Hydeborn Corp., which aided in the financing of manufacture and sales of Willys-Overland cars prior to and since the receivership, has filed objections in Federal court in Toledo to the proposed reorganization of Willys-Overland, Inc., sales subsidiary of the manufacturing company, under Section 77b of the Federal Corporate Reorganization Act.

The Hydeborn Corp. claims to be a creditor in the amount of \$30,000. Its objection was filed by Attorney George Ritter. Hearing on the objection was scheduled before Judge George P. Hahn Friday.

John N. Willys, receiver and former chairman of the board of the company, and Chicago interests were understood to be stockholders of the Hydeborn Corp.

Spangler Named to MEMA Directorate

Jack M. Spangler, general sales manager of National Carbon Co., New York, was named to the board of directors of the Motor and Equipment Manufacturers Association at a meeting of the board held in the Ambassador Hotel, New York, Jan. 8. He also was named chairman of the MEMA Wholesalers Relations Committee which will act as the point of contact with a similar relations committee from the MEWA for discussions of the "BUYmanship" program being developed by that organization.

John W. Anderson, president of The Anderson Co., Gary, Ind., and Malcolm McCormick, sales manager of the Walker Mfg. Co., Racine, Wis., also were added to the Wholesalers Relations Committee.

All Transportation Under U.S. Control, F.D.R.'s Aim

Federal regulation of all forms of transportation is definitely among the legislative aims of the Administration during the present Congressional session. In his opening speech to Congress the President said in discussion of prospective measures of national importance, "Among the subjects that lie immediately before us are the consolidation of Federal regulatory administration over all forms of transportation. . . ."

Mr. Roosevelt's position on this subject coincides with the program which Joseph B. Eastman, Federal Coordinator of Railroads has been advocating for some time.

That the President will make efforts to have Congress pass a broad program of social legislation was indicated when he said, "I shall send to you recommendations . . . on the broad subjects of unemployment insurance and old age insurance, of benefits for children, for mothers, for the handicapped, for maternity care and for other aspects of dependency and illness where a beginning can be made now."



John R. Lee

John R. Lee

John R. Lee, vice president of Dodge Brothers Corp., died suddenly last Sunday. He was 58 years old.

Mr. Lee joined the Ford Motor organization in 1911, at the time the John R. Keim Co., accessory manufacturers at Buffalo, of which he was general manager, was taken over by Ford. He resigned from the Ford company in 1919 and for the next two years was associated with the old Wills Sainte Clair Company. A year after leaving that organization he joined Dodge Brothers, Inc., as assistant sales manager, and was made general sales manager in 1926. Three years ago Mr. Lee was made vice president. During recent years he has devoted much of his time to the affairs of the Fargo Truck sales group of the corporation.

He is survived by his wife, Jessie D. Lee; three brothers, Lawrence W. of Detroit, and Herbert B. and Porter R., of New York City.; and a sister, Mrs. Everett E. Green, of Elma, N. Y.

MEMA, MEWA, NSPA Heads Discuss Service Show

Presidents of the Motor and Equipment Manufacturers Association, the Motor and Equipment Wholesalers Association and the National Standard Parts Association met in New York this week to discuss plans for the Automotive Service Industries Show to be held next fall.

George R. Welch

George R. Welch, well-known automotive engineer, died Sunday in Henry Ford Hospital. He was 56 years old.

For more than 30 years Mr. Welch had been engineer for the Holley Carburetor Co. and was the inventor of the Holley vaporizer carburetor. He is survived by his wife, a brother and four sisters.

Plymouth Early Jan. Sales 1280 Over '34

Plymouth dealers delivered 3,972 new cars at retail during first week of January compared with 1,690 units during corresponding week of last year, according to D. S. Eddins, Plymouth president.

Mr. Eddins said the Plymouth plant is operating on a capacity basis, fully two months ahead of its production schedules of last year. He said the corporation has shipped 43,000 new cars to dealers in every section of this country, Canada and foreign countries. Orders have been received for nearly \$50,000,000 worth of 1935 cars, Mr. Eddins stated.

Show Starts Race For Car Sales

(Continued from page 33)

duce prices to stimulate volume is not likely to manifest itself.

The labor situation also is uncertain, but there was considerable opinion that it would not prove a seriously disturbing factor. In this connection the results of the recent elections conducted by the ALB in the Cadillac and Chevrolet forge plants, have been decidedly encouraging because they have indicated that the workers prefer to bargain through representatives selected from their own ranks rather than through labor organizations.

As for the show itself, it was another outstandingly interesting exhibition. The decorations were the best in history and the manufacturers went to considerable lengths to provide something besides a flock of highly polished cars for the public to look at. Although nothing official was given out regarding attendance during the early days of the show, it is understood that the totals were somewhat under last year's record-breaking figures. The decreases were not interpreted as indicative of any lessening in public interest, but were attributed to smaller out-of-town attendance because the Show was put on by the local dealers instead of the manufacturers.

Members of the local dealers' association were enthusiastic about the exhibition. They felt that they were getting more out of it than in the past when operated under manufacturer sponsorship and that they had demonstrated their ability to put on a successful exhibition.

From the trade standpoint, however, the fact that the exhibition was not a national show undoubtedly diminished the glamor which surrounds the event. There was, of course no AMA dinner and few of the manufacturers had dealer meetings. Newspaper advertising was somewhat below last year and there was less ballyhoo over the radio.

Who will stage next year's show is still an open question. There is little doubt, however, that New York dealers will make a determined effort to keep the exhibition under their control.

Durant Acquires Interest In Flint Spark Plug Co.

William C. Durant, veteran of the automotive industry, has acquired an interest in the Flint Spark Plug Co., according to the Flint Daily Journal. Mr. Durant, it is understood, has been associated with the company for about a month as vice president in charge of organization policies.

The Flint Spark Plug Co. is a closed corporation with a capitalization of \$16,000, and no one individual has a controlling interest. The other officers are Graham G. Somers, president and in charge of engineering; Ralph B. Vessey, vice president in charge of manufacturing; Archie R. Campbell, treasurer and sales manager, and George E. Boysen. The officers form the board of directors.

The acquisition of an interest in this company marks Mr. Durant's first venture into a manufacturing concern since the Durant Motors went out of business several years ago.

with few exceptions, also acknowledge the soundness of proper used car valuation, and recognized this even before the code. The statement of Mr. Reeves, therefore, is evidently aimed at sources of supply of raw materials over which they have no control and which may have been affected by the codes in their purchase of such materials.



William C. Durant

AMA Opposes Price and Production Control

(Continued from page 33)

established prices and many dealers feel that without this provision, the prohibition on allowances in excess of guide book figures doesn't mean much. They hold that if there is no ban on cutting new car prices, even through over allowances on used cars are barred, the objective of the code cannot be attained.

The AMA letter follows:

By unanimous vote, members of the Board of Directors of the Automobile Manufacturers Association, who constitute the administration agency for the Automobile Manufacturing Code, have asked me to record with you their opposition to the continuation of trade practice provisions in any code of fair competition where the direct or indirect objective is price fixing, price maintenance or production control.

Lower costs and lower prices increase volume and hence employment. Higher costs and higher prices mean decreased volume and less employment.

Trade practice provisions designed to accomplish price fixing, price maintenance or production control must inevitably lead to the regimentation of business and to the sacrifice of efficiency at the cost of the consumer.

We favor free and open competition under regulations laid down by Congress to prevent anti-social practices.

Commenting on the AMA letter, F. W. A. Vesper, president of the National Automobile Dealers Association, says: "Manufacturers have always exercised absolute control of the prices of finished automobiles to consumers, and instances of contract cancellation arising from going overboard on factory established prices have been known. Under our code dealers do not fix prices, but are bound to maintain prices established by manufacturers. Furthermore, all other charges such as delivery, make ready, accessory package and others have been arbitrarily set by manufacturers and dealers simply maintain the prices so set. Factories,

Piece Work Compensation Must Be Computed Weekly

The National Industrial Recovery Board has ruled that payment to employees in codified industries engaged on a piece work basis must be computed on the basis of not more than seven consecutive days and must be not less than the minimum hourly rate specified in the appropriate code multiplied by the number of hours worked in the period.

The ruling also states that "if any such provision in a code as thus applied should work hardship in any case by reason of peculiar circumstances or methods of operation, the employer affected thereby may apply for an exemption to such provision."

Ford Schedules 220,000 Units for Jan. and Feb.

Production figures on the 1935 models just released by the Ford Motor Co. show that 50,002 new units have been turned off the assembly line by Jan. 8. Schedules for this month and February call for 110,000 units per month. At the present there are 70,767 men employed by the Ford organization in the Detroit area.

Late reports from dealers all over the country show that visitors to show rooms to view the new car totaled 8,683,900, an approximate increase of 73 per cent over the reception given the Model A.

Second of NLRB Hearing On Code Provisions Jan. 30

The National Industrial Recovery Board has announced that a hearing will be held Jan. 30 on the subject of employment provisions in codes.

This will be the second of a series of open hearings to collect evidence on the operations of major code provisions. The first hearing began Jan. 10 and deals with the subject of price control or price fixing.

Among the 250 persons who have asked to present views at the hearing on price controls is David B. Spielman, president, Spielman Motor Sales Co., Inc., New York, who will discuss the trade-in allowance provision of the retail motor vehicle code concerning which arguments soon will be heard before the Supreme Court of the United States in the Spielman case. The company was haled before the Supreme Court of New York for alleged violation of the provision. The Court ruled against the Spielman company, and an appeal was taken to the Supreme Court by the dealer.

Other witnesses to be heard are F. W. A. Vesper, chairman, National Control Committee, Motor Vehicle Retail Trade, who will present views in connection with the motor retail code; A. M. Andrews, secretary and executive officer, Code Authority, Commercial Vehicle Body Industry; Sol Herzog, who will discuss code provisions of the motor vehicle, parking and storage and other codes; C. O. Skinner, Detroit, executive secretary, Code Authority, Automotive Parts and Equipment Industry, who will present general views on the subject of price control.

Studebaker Revamping Plan Well Received

Studebaker corporation common stockholders' protective committee will place no blocks in the path of swift reorganization of the company in the opinion of C. P. DuComb, president of the Merchants' National Bank, South Bend, who is a member of the committee and has returned from a meeting of the group in New York.

The other members of the committee are J. L. Van Zelm and Clinton S. Lutkins, New York. Mr. DuComb said: "We discussed the proposed plan at length and in great detail and there was a favorable feeling toward its fruition. We are going to put the plan over." The plan in the main was approved, he said.

John T. Stanley

John T. Stanley, president of the soap manufacturing company which bears his name, died at his home in New York last Sunday. Mr. Stanley was 92 years old. He is survived by a daughter and two sons.

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for Automotive Industries

There was a moderate recession in business activity last week, but the decline was the smallest post-holiday reaction in many years. Declines occurred in many industries because of inventory-taking and shut-downs for the holidays. However, steel operations increased for the eleventh successive week; and the level of production is now 25 per cent above that of a year ago.

Car Loadings Irregular

Railway freight loadings during the week ended December 22 totaled 547,895 cars, which marks a decrease of 32,040 cars below those during the preceding week, an increase of 16,431 cars above those a year ago, and an increase of 53,385 cars above those two years ago.

According to estimates compiled by the shippers' regional boards, railway freight loadings during the first quarter of this year will be about 0.6 per cent above those during the corresponding period last year.

Current Production Gains

Production of electricity by the electric light and power industry in the United States during the week ended December 29 was 7.2 per cent above that in the corresponding period last year. Production during the preceding week was the largest reported since the week ended December 21, 1929.

Crude Output Variable

Average daily crude oil production during the week ended December 29 amounted to 2,440,700 barrels, which was 19,600 barrels below the Federal allowable quota. The current figure compares with 2,423,150 barrels for the preceding week and 2,139,850 barrels for a year ago.

Bituminous Mining Increases

Production of bituminous coal during the week ended December 22 amounted to 8,060,000 tons, which marks an increase of 170,000 tons above that in the preceding week and an increase of 880,000 tons above that in the corresponding period last year.

Fisher's Index

Professor Fisher's index of wholesale commodity prices for the week ended January 5 stood at 79.4, as against 78.7 for the week before and 78.4 for two weeks before.

Federal Reserve Statement

The consolidated statement of the Federal Reserve banks for the week ended January 2 showed an increase of \$2,000,000 in holdings of discounted bills and an increase of \$1,000,000 in holdings of government securities. Holdings of bills bought in the open market remained unchanged.

bility of making certain second-quarter price adjustments that have recently come in for much discussion.

Pig Iron—Demand from automotive foundries continues to show gains in the aggregate, but melters continue to take in iron, as they need it, rather than stock heavy tonnages. More single carloads are being called for, but there is virtually no contracting for representative tonnages. Prices continue unchanged.

Aluminum—Further fractional advances have been filed by secondary aluminum refiners. The best grade of No. 12 alloy is now quoted at 17½ cents, which is ¾ cent higher than formerly. Virgin metal prices remain unaltered. The code of the aluminum industry has been extended another 45 days.

Copper—Although the market's statistical position shows only minor improvement, holders of "outside" copper are none too eager to sell. They are apparently confident that before long the "Blue Eagle" price will be lifted as the result of international producers' pacts and they look for the price of "outside" metal to go higher than the 7½ cent level at which it is now quoted. The "Blue Eagle" price continues unchanged at 9 cents, delivered Connecticut.

Tin—Chiefly under the influence of the Sterling exchange market, the price of spot Straits tin went to 50.55 cents at the beginning of the week, consuming interest being rather light.

Lead—Quiet and steady.

Zinc—Strong and fractionally higher.

Kelsey-Hayes Workers Discuss NLRB Election

A mass meeting for all employees of Kelsey-Hayes Wheel Co. was scheduled for Sunday afternoon Jan. 6. One of the questions to be brought before the meeting was the election of representatives for collective bargaining, under the auspices of the National Labor Relations Board, with the cooperation of the Local Union No. 18677, United Automobile Workers.

The election at Kelsey-Hayes plant, which is under the automotive parts code, will be under the NLRB, and not the Automobile Labor Board.

New Model Orders Jam Sheet Finishing Mills

Steel Sellers Hopeful New Car Buying Will Aid in Price Revisions

The proverbial feast or famine complex of the steel market is again having its inning. While the market is no longer the pauper, as it was pictured in September, it still has a long road to travel before it may be likened to the prince. That, however, does not diminish the enthusiasm with which isolated instances of smaller finishing mills with an especially extensive backlog, and of others that have a heavy run of immediate shipment business on their books, are being magnified into capacity operations and a sold-out condition for the steel industry as a whole.

In some plants pressure on finishing

capacity, resulting from the demand for rush shipments of automobile sheets, is relatively high, but even what may be classed as unreasonable demands in the way of expediting deliveries are being met. Aside from full-finished sheets, the movement of steel products into automotive consumption is utterly devoid of the spectacular and very much along routine lines.

While developments in Washington have brought heavier demand for structural and other kinds of steel somewhat nearer, automotive demands continue to furnish the steel industry's chief nourishment. Steel sellers are rather comforted by the possibility of upward revision of automobile prices, should the public's buying support make moderate advances later in the year feasible, because the slender profit margin on new models tends to put prevailing steel prices on the defensive and eliminates the possi-

New Campbell-Ewald Co.

H. T. Ewald, president of the Campbell-Ewald Company, has announced the formation of a new company in New York to be known as the Campbell-Ewald Company of New York, Inc. The new company was formed, according to Mr. Ewald, to give a more personalized, more complete service to clients in the most important city and territory in the United States.

Thorne Named Olds Chassis Engineer

Maurice W. Thorne has been appointed chassis engineer of the Olds Motor Works, by Harold T. Youngren, Olds chief engineer. Mr. Thorne recently joined the Olds organization as project engineer. Formerly he was experimental engineer for Pierce-Arrow, and at one time was in charge of the research department of the Chilton Co., publisher of *Automotive Industries*.

Citroen Liquidators May Present Plan In Spring; Industry Backing Producer

by W. F. Bradley

Paris Correspondent, Automotive Industries

PARIS (By Mail)—In all probability it will be late March or early April before the three liquidators appointed by the court are ready to present their plan for the reconstruction and continuation of the André Citroen Company, the largest automobile manufacturing concern in France, which went into judicial liquidation late in December upon application of the Franco-American Rim Co.

Full activity in the plant probably will not be resumed until the latter part of this month.

While shareholders and bondholders are certain to suffer heavy losses, supply firms are also heavily involved and may have to accept a reduction of their credits with payments spread over several years. Meanwhile the business is being carried on on a reduced scale, the liquidators placing no orders unless there is a guarantee that they can be met.

The most important single creditor is Michelin, who has supplied tires to the Citroen Company since the firm came into existence. The outstanding debts of various supply firms amount to not less than \$8,000,000. Among the companies with larger claims against Citroen are the Budd Company, \$1,300,000; Perrot-Bendix Company, about \$240,000; Lockheed, \$100,000, and the Champion Spark Plug Co.

The French motor industry is standing solidly back of Citroen and is doing everything possible to place the company on a sound financial basis. Maurice Goudard, president of the Solex Carburetor Company, speaking as president of the French Syndicate of French Accessory Manufacturers, the members of which have \$8,000,000 at stake, stated: "It is no use wasting time criticizing past mistakes. We have to look at the present and the future; help to get the company on a sound financial basis and keep it there."

Louis Renault and Robert Peugeot, the two leading manufacturers, have given a promise that they will not do anything which will embarrass the Citroen Company. Michelin has promised his cooperation.

André Citroen was a great admirer of everything American. A portrait of Henry Ford always stood on his desk and he was particularly pleased at being referred to as the European Ford.

Having attained a production of 100 cars per day, Citroen increased until he reached the peak of 700 per day. He completely revolutionized the European industry by driving other manufacturers into mass production.

André Citroen applied American methods of servicing and marketing. In place of back shop mechanics, working with a few hand tools, he created service depots all over France, and in many a provincial town the finest building is a Citroen establishment. Assembly or manufacturing plants were erected in England, Italy, Germany, and other foreign countries and at one time Citroen nursed plans for getting on the American market.

Criticism is now directed against the extravagance of many of his schemes. Last

year he erected a new factory, at a cost of \$9,000,000, although the existing factory was more than sufficient to meet requirements. At the inauguration he gave a banquet to 6000 people united in the delivery hall. Several prominent members of the American automotive industry were at the table of honor. An exhibition hall in Brussels cost \$2,000,000; a motor expedition to Central Asia cost \$1,600,000. This had been preceded by several costly expeditions across Africa. For the last two years he has maintained, in Paris, the biggest automobile showrooms in the world. His Eiffel Tower illuminations cost \$700 per night.

The public first became aware that Citroen was in difficulties when he was unable to meet his bills about a year ago. The banks then appointed two experts to make a report. The technical report, by Engineer Caquot, being favorable, was issued to the public. The financial report has been kept secret. Up to July there was difficulty in meeting the monthly bills. A consolidation plan was drawn up in July, but it was not accepted. In September the bills could not be met, but in October confidence was regained when it was announced that Michelin was going to take control and put in new capital.

Last May a new front drive model was brought out, and although it was successful, it failed to perform the miracle that was expected of it. Michelin, in full control, exercised drastic economies, reducing the staff by 1000 and turning off 5000 workers without lowering the production.

A plan drawn up by Michelin provided

for the payment of outstanding debts over a period of three years, but the banks refused to discount this paper, and the supply firms asked for certain guarantees, notably that the manufacture of certain specialized parts should be dropped and that after the agreement had been signed the suppliers should not be changed. The banks, apparently, were in favor of an important reduction in the capital, which stands at practically \$27,000,000, followed by an increase to the original amount by bringing in fresh capital. Michelin was opposed to this and the negotiations were broken off. With the failure of this plan, liquidation was inevitable.

Critics point out that from 1929 to 1933, the net profits averaged \$2,000,000. In January of this year a dividend of 40 francs per share was paid, totaling approximately \$1,700,000. A month later bills could not be met, and the balance sheet just deposited with the Court shows a loss for 1934 of more than \$9,000,000.

Issued at 500 francs, Citroen shares were quoted at 52½ just before the liquidation. In 1929 and 1930 they stood at 1869 francs, and the highest figure this year was 525 francs.

Automotive Employment Nears Peak in Toledo

Automotive employment in Toledo is now at a high peak, even though production at Willys-Overland plant is a little behind schedule due to some delay in receiving materials.

Libbey-Owens-Ford Glass Co., has recalled more than 600 workmen in the last week, largely on account of the big demand for safety glass. Chevrolet, Spicer Manufacturing Corp., and Electric Auto-Lite Co., have about 9000 workers on payrolls. Many of the smaller parts plants are also building up employment and production schedules.

CALENDAR OF COMING EVENTS

SHOWS

Washington Automotive Assoc., Automobile Show	Jan. 12-19, 1935
Toronto, Canada Automobile Show	Jan. 12-19
Newark, N. J. Automobile Show	Jan. 12-19
Buffalo, N. Y. Automobile Show	Jan. 12-19
Cleveland Automobile Show	Jan. 12-19
Milwaukee Automobile Show	Jan. 12-19
Detroit Automobile Show	Jan. 12-19
Springfield, Ill., Automotive Show	Jan. 13-20
Brooklyn, N. Y. Automobile Show	Jan. 14-19
Philadelphia Automobile Trade Assoc.—Automobile Show	Jan. 14-19
National Motor Boat Show, New York	Jan. 18-26
Toledo Automobile Show	Jan. 18-24
Columbus, Ohio Automobile Show	Jan. 19-24
San Francisco Automobile Show	Jan. 19-26
Boston Automobile Dealers Assoc.—Automobile Show	Jan. 19-26
Pittsburgh, Pa. Automobile Show	Jan. 19-26
Hartford, Conn. Automobile Show	Jan. 19-26
Syracuse Automobile Show	Jan. 19-26
Nashville, Tenn., Automobile Show	Jan. 20-26
Baltimore—Automobile Show	Jan. 21-26
Rochester Automobile Show	Jan. 21-26
Lansing Automobile Show	Jan. 22-27
Chicago Automobile Show	Jan. 26-Feb. 2
Montreal, Que., Automobile Show	Jan. 26-Feb. 2

Springfield, Mass. Automobile Show	Jan. 28-Feb. 2
Lancaster Automobile Show	Jan. 29-Feb. 2
Harrisburg Automobile Show	Jan. 30-Feb. 2
Omaha Automobile Show	Feb. 3-9
Wilmington, Del., Automobile Show	Feb. 3-9
Kansas City, Mo. Automobile Show	Feb. 9-16
Denver, Colo. Automobile Show	Feb. 10-23
Peoria, Ill., Automobile Show	Feb. 13-17
Bethlehem, Pa., Automobile Show	Feb. 13-23
Evansville, Ind. Automobile Show	Feb. 23-27
Minneapolis Automobile Show	Mar. 9-16
Mankato, Minn. Automobile Show	Mar. 16-23

ANNUAL MEETINGS

Society of Automotive Engineers—Annual Meeting—Detroit	Jan. 14-18
American Roadbuilders Assoc., Washington, D. C.	Jan. 22-25
Automotive Parts & Equipment Mfrs., Inc.—Chicago	Jan. 29

CONVENTIONS

National Automobile Dealers Assn., Detroit	Jan. 14-15
Lafayette, Ind. (Purdue University), Automotive Service Conference	Mar. 21-22

Style Refinements and Weight Among Major Developments in

WHILE the average visitor to the New York show may carry away the impression that important changes were made in automobile design during the past year, the fact is that the principal changes are on the surface. Under the hood and under the body, except for the general redistribution of weight for better riding qualities, cars are a good deal the same as last year, even though numerous detail improvements are listed.

Most of the efforts of engineering departments evidently have been spent on the sheet-metal work, in efforts to enhance the sales appeal of general appearance. "Streamlining" has been the catchword, although the most important step toward true streamlining probably has been the stowing away of the spare wheel inside the rear of the body, which has become the rather general practice. Both windshield and rear panel are decidedly more sloping than in the past, and fenders and other projecting parts also have been improved in shape with a view to minimizing their air resistances.

Quite a number of designers appear to be of the opinion that a car approaching a simple theoretical streamlined body in shape, and which would necessarily have a very broad nose, would not appeal to the buying public. They therefore have resorted to the expedient of "streamlining" the elements of the vehicle separately, giving what appears to them the most desir-

able or the most attractive form to the combination of radiator grille and hood, and to the fenders, and then joining these parts by sheet-metal enclosures of the general form of airplane wing sections, which are streamlined bodies in themselves.

There no doubt has been a great deal

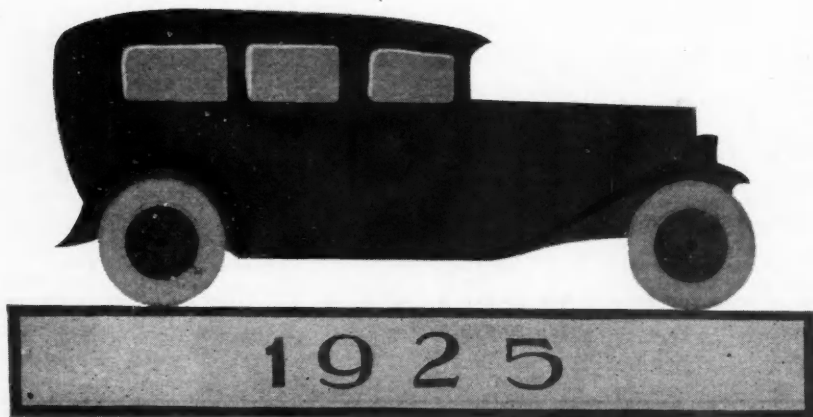
of curiosity, both within the industry and among the motoring public, as to how independent front springing would emerge from its first year's trial by American motorists. If the makers' programs for next year are any criterion they have stood the test well. The system is continued substantially unchanged by most of the companies which adopted it last year; two additional companies have newly adopted it this year, and in the few cases where it was abandoned, its relatively higher cost probably was influential in the decision.

That independent front springing as now used on American cars is more expensive in production than the conventional system has been known for quite some time. It is strongly brought home to the buying public by the fact that there are now two makes of car which are being offered in two lines each, at different price levels, and in each case the more expensive line has independent front springing while the other has not.

While independent front spring-



Spare wheels are now generally carried in the tail of the car, as in the Nash shown above

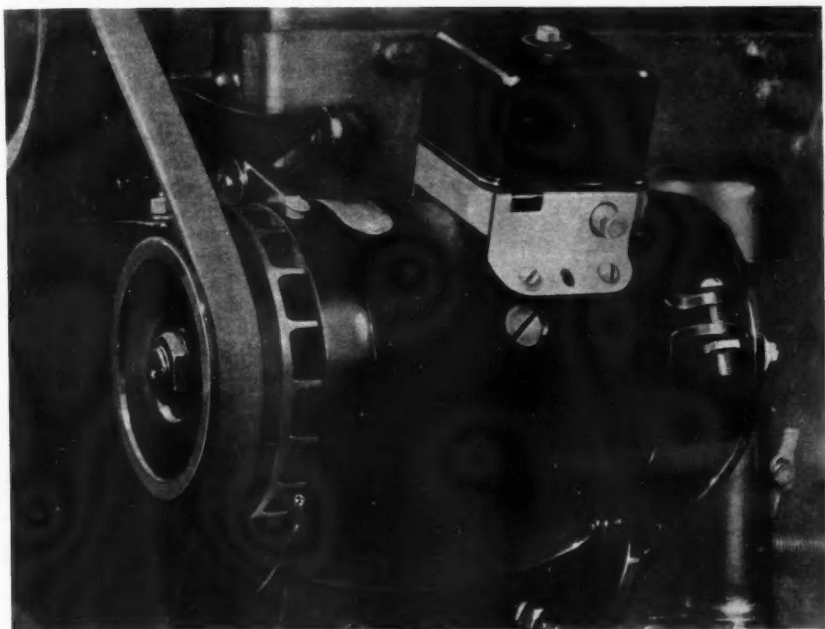


Redistribution

New 1935 Models

by P. M. Heldt

Engineering Editor,
Automotive Industries



Nearly all generators are cooled by centrifugal fans combined with the driving pulley

achieved by increasing the breathing capacity and the compression ratio, rather than by increasing engine displacement. It seems remarkable that it should be possible to increase the compression ratio year after year without producing engines that are prone to "knock their heads off." Compression ratios of 6.5 and even 6.7 are used in engines with cast-iron heads, while only a few years ago such ratios were considered excessive for engines with aluminum heads. Improvement in the forms of combustion chambers no doubt accounts for part of the gain, but progress in this direction would have been much slower had it not been for the improvements made in commercial fuels with respect to anti-detonating properties. It is also not unlikely that improvements in heat control to the manifold, by means of thermostats, have been a helpful factor.

One other factor that enters into the problem of maximum permissible compression ratio is that of spark control. Where a very high compression ratio is used, spark control by inlet-manifold vacuum is usually employed, and when the engine is pulled down in speed by heavy load, the spark is much retarded, which counteracts the effects of high compression to a certain extent under conditions where detonation would normally occur.

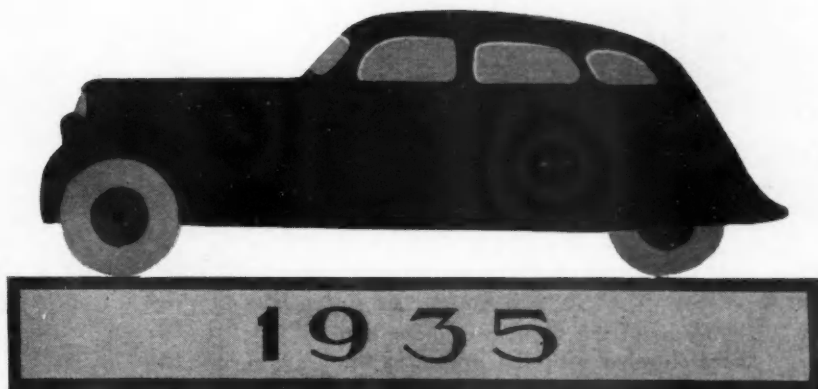
The average standard compression ratio of all passenger-car engines crept up in the course of the year from 5.72 to 5.94.

ing has not swept the whole industry, another change inaugurated last year to increase riding comfort has practically done so. This development consisted in moving the powerplant forward over the front axle and increasing the range of action of the front springs.

For a great many years it was the general practice to place the radiator almost directly over the front axle and the engine some distance to the rear, where it could be mounted low without interference with the axle center. This year the engines in most cases are from 6 to 8 in. farther forward, which not only has the advantage that it reduces the frequency of pitching motion of the vehicle, thereby rendering such motion less annoying to occupants, but permits of moving all seats forward, bringing the rear seats ahead of the rear axle, where its occupants are better protected from road shocks to the rear wheels. Location of the rear seat ahead of the rear axle, moreover, is not only desirable from the standpoint of rear-seat comfort, but is necessary if the tail of the cars is to be sloped

strongly for streamlined appearance purposes and particularly if room is to be provided in it where a spare wheel can be stowed away in a horizontal position.

Engines are again more powerful than last year, but in practically all cases the increase in output has been



With increase in the compression ratio the compression-chamber volume has decreased, and this has made it more difficult—particularly in L-head engines—to obtain the clearance necessary for free flow around the valves. Considerable research work has been done during the past year to determine the optimum form for the compression chamber from the standpoint of minimum restriction of gas flow. It has long been known that there is less difficulty in properly evacuating the cylinder of spent gases at high speeds than there is in properly filling it with new charge under the same conditions, and that exhaust valves can be made somewhat smaller than inlet valves. For

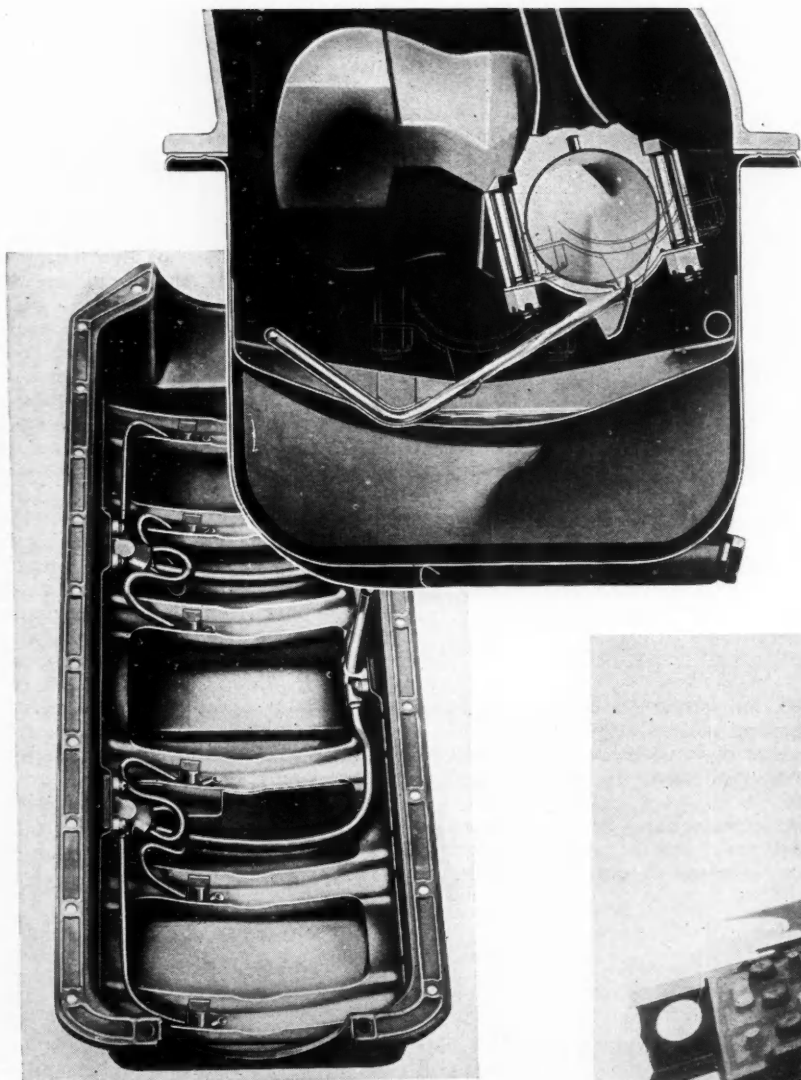
the same fundamental reason, not so much clearance is needed over and around the exhaust valve as over and around the inlet valve, and if the combustion chamber is redesigned in accordance with this finding, the breathing capacity of the inlet system is increased and the volumetric efficiency of the engine is better maintained at high speeds. Furthermore, increased area-to-volume ratio at the exhaust valves improves cooling of the latter and reduces detonation tendencies.

Constant increase in the specific output of engines has called for intensified cooling of cylinder walls, and particularly of exhaust-valve seats. Two practices which, while not new, have come

into wider use this year, are the provision of water distributors inside the cylinder jacket which deliver jets against the walls of the exhaust-valve pockets, and the carrying of cylinder jackets all the way down to the crankcase. Throwing a jet of cool water directly against the wall of the exhaust-valve pocket naturally lowers the working temperature of the exhaust-valve seat and reduces wear of the seat and "sinkage" of the valve. Extending the water jacket all the way down the cylinder wall is evidently intended to reduce the temperature of the crankcase oil and thus to safeguard the wearing parts under severe operating conditions.

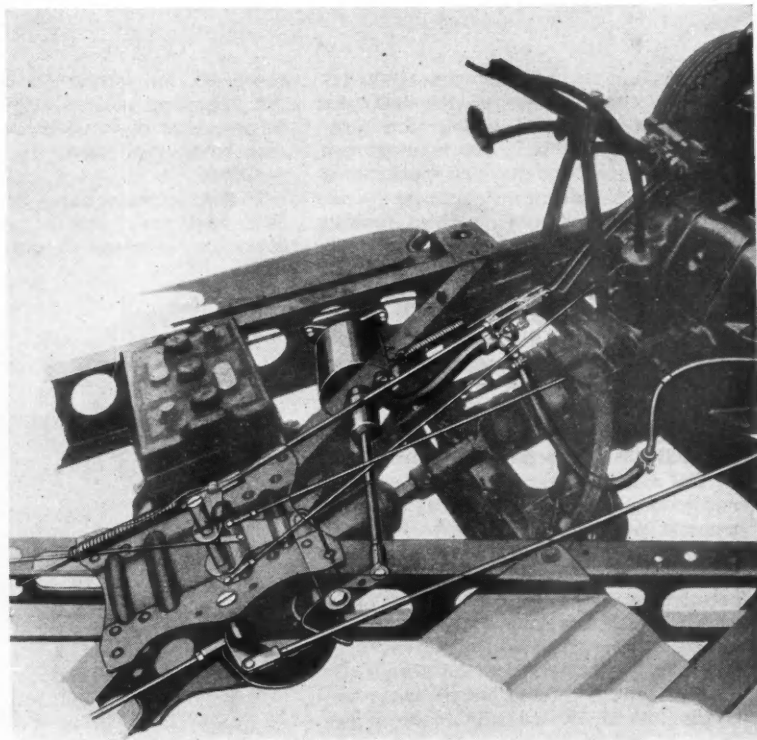
Bearing loads increase with an increase in engine speed, and it would seem that in some cases the factor of safety had become rather inadequate. To reduce the loads on main bearings, crankshafts have been more fully counterweighted in a number of instances. The most heavily loaded bearing in most engines—aside from the piston-pin bearing, at which there is little frictional motion—is still the crankpin bearing, and in two additional makes of passenger-car engines these bearings are now made of high leaded bronze. The new cadmium-silver-copper bearing metal is used in the crankpin bearings of at least one make of engine. This metal, like the leaded bronzes, has a much higher melting temperature than babbitt, and it does not suffer the same loss in strength at working temperatures as babbitt metal.

Aluminum cylinder heads appear to have gained still further, although they



View illustrating the jet-lubrication of crankpin bearings in the new Chevrolet

Hook-up of the vacuum cylinder and control valve with the brakes in the Hupmobile



have been discontinued by one maker of low-priced cars as standard equipment, probably largely on the basis of cost involved.

During the past five years or so quite a number of mechanical devices were evolved which add to the comfort, convenience or operating economy of the car. It was rather surprising to see how rapidly some of these became standard equipment on a considerable number of car makes, especially when one considered how long it took the industry to see sufficient need for shock absorbers (spring dampers) to make them standard equipment. Evidently, during the past several years, and in spite of the hard times, makers based a good deal of their sales appeal on equipment.

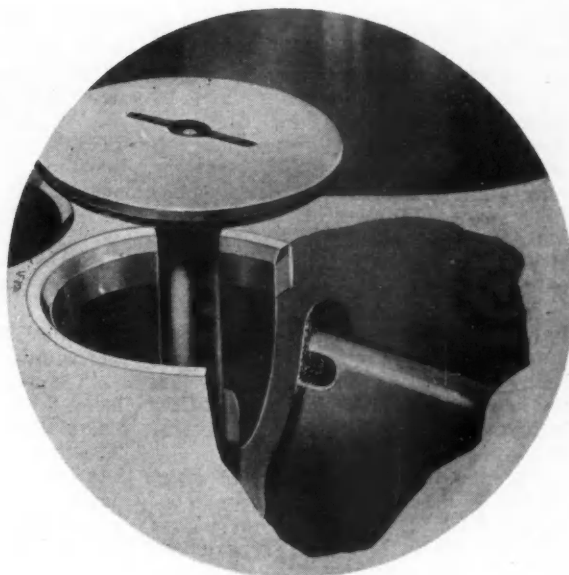
A reversion from this trend is rather strongly in evidence this year. Increased manufacturing costs together with the continuance of low purchasing power seem to have induced a number of manufacturers to drop certain features, and various items of equipment that were standard last year are now extra or are not supplied at all.

There has not been much change in carburetor equipment. Downdraft carburetors are now nearly universal and air cleaners and intake silencers are extensively fitted. On most eight-cylinder engines, whether of the V or inline type, dual carburetors are now fitted. This applies even in the case of the Graham supercharged eight, where the carburetor is mounted ahead of the supercharger and both branches of the dual carburetor therefore discharge into the same passage. Chrysler, on the other hand, has returned to the single carburetor.

In a number of cases the spark coils have been removed from the dash to the engine. This reduces the length of high tension cable, renders radio-shielding easier, and the effect on the ignition is entirely beneficial.

Cooling systems have been generally improved. The provision of distributor pipes inside the water jacket and the lengthening of the jackets have been referred to. Instead of the old system of circulation control, which depended on a thermostatically-controlled choke valve

Illustration showing the jet-cooling of exhaust valve seats



in the outlet from the engine jacket, the by-pass system is now almost universally used, in which the water begins to circulate through the jacket as soon as the engine is started but through the radiator only when the water at the engine outlet has reached the predetermined temperature. In a new arrangement used on Studebaker engines the thermostatic valve is combined with a by-pass. With this system some water is by-passed around the radiator at all times, but only a small fraction of the total amount circulated is by-passed when the choke valve is open.

Pump shafts and their bearings have long been a source of trouble and a number of laudable attempts have been made to improve upon them. Needle bearings are now used on the pump shafts of Hudson and Essex cars. Chrysler pumps have Oilite bearings, and on the Graham, automatic pump seals of Schwitzer-Cummins make, which obviate the need for the usual pump-shaft packings, are used. In some cases pumps and connections have been enlarged to assure more rapid circula-

tion and keep down the temperature gradient in the cooling system.

Engine lubrication systems also have had their share of attention. In at least two makes of engine, metering orifices are used in the crankshaft, with the result that the rate of oil delivery to the crankpin bearing is independent (to a large extent at least) of the bearing clearance and therefore does not vary with the state of wear of the engine. It appears that some trouble has been experienced from inability to maintain the predetermined oil pressure after the car has piled up considerable mileage. Depending upon the metering orifice instead of the crankpin-bearing clearance for metering the flow of oil will tend to overcome this. Another improvement made partly with the same object in view is an enlargement of oil pumps and oil passages. However, the main object in providing larger oil passages seems to be to assure that normal lubrication of the engine will follow starting from cold at a shorter interval. In a Cuno oil filter used on Packard cars, variations in oil pressure automatically clean the filtering medium at intervals.

Chevrolet has added what is known as jet lubrication for the crankpin bearings for better high-speed lubrication. A jet of oil from the distributing header is shot directly into the scoop on the connecting-rod cap, and the pressure behind this jet naturally increases with the speed of the engine.

The need for increased generating capacity, to which attention was called in these columns a year ago, has been met by most manufacturers. Apparently the increase in capacity has been obtained without increase in bulk and weight of generators, by merely providing a cooling fan and possibly increasing the relative speed of the generator. On Packard cars, generators now have a charging capacity of 30

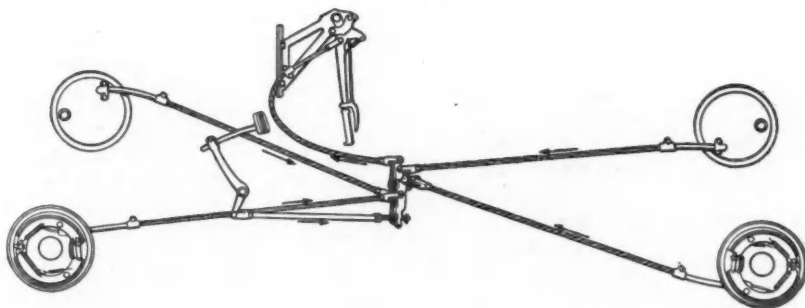


Diagram of the simple brake equalizing system used on Hudson and Terraplane cars

amps. With the increase in charging rate there is, of course, increased danger of continuous overcharging on cars on which, for one reason or another, little electrical energy is consumed. Continuous overcharging is not only wasteful but injurious to the battery, and to guard against it, further makes have provided protecting relays.

One maker has returned to the positive direct starter shift from the solenoid engagement control.

In cars having depressed-beam headlight control, the driver is sometimes unable to say whether his headlamp beams are raised or lowered. Some cars are now provided with indicators on the instrument board showing the setting of the lamp control.

For the first time in a good many years considerable effort has been spent on clutches. The reason is that a good deal of trouble has been experienced with clutches on some cars of recent vintage. Two concurrent developments of recent years combined to bring about this situation. In the first place, engine power was added to from year to year while clutch dimensions usually remained the same. On the other hand, much has been done in recent years to make the controls easier to operate. So far as the clutch is concerned, this could be done either by increasing the mechanical advantage of the clutch pedal, which, of course, necessitated increased pedal travel and therefore was not a clear gain; or by decreasing the pressure on the clutch plates, thereby decreasing the reserve capacity of the clutch. A point was finally reached, in some cars at least, where there was considerable clutch slippage during engagement, with consequent heating and wear.

To minimize heating and its effect on wear, clutch housings are now ventilated in a good many cars. The ventilating openings are screened to prevent dirt from getting into the clutch.

Another method of dealing with the problem consists in providing what has been referred to as semi-centrifugal control. By this system the clutch is provided with a spring or set of springs that are comparatively light and provide insufficient pressure on the fric-

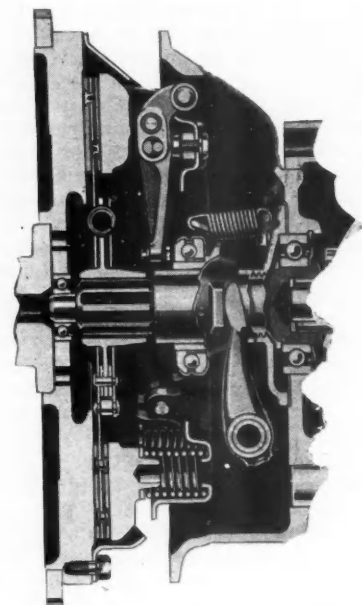
tional surfaces to transmit the maximum engine torque. The clutch levers, which transmit the disengaging force from the throwout collar to the clutch plates, are provided with masses which, being subjected to centrifugal force, tend to press the clutch plates together with greater force. Thus the pressure between plates—and the pedal pressure required for disengagement—increases with the speed of the engine. As a rule the clutch is disengaged only while the engine is throttled, and the driver therefore need not press very hard on the clutch pedal.

In a number of cases clutch designs have been further improved to make the clutches less harsh and "grabby." The vacuum type of automatic clutch has been given up as standard equipment on some makes.

The only really new development in connection with transmissions is the offering of pneumatic shift by Hudson-Essex as special equipment. Gear synchronizers have made some additional gains. Free-wheeling as standard equipment has been dropped by Studebaker and Chrysler, except for the models provided with an overdrive unit, and on Dodge and Plymouth among others. The automatic overdrive, which was introduced by Chrysler last year, is now being offered also by two other makers. This, as is generally known, is a Warner-Gear development.

During recent years, when engine mountings became more and more flexible, some makers found it expedient to support the gearshift and brake levers on the frame, so as to prevent vibratory motion of these levers relative to body parts with the car under way. This evidently did not prove entirely satisfactory either, for Dodge now has returned to the original method of mounting the shift lever on the transmission housing. Chevrolet, on the other hand, now mounts the brake lever on the frame instead of on the transmission.

Hydraulic brakes have scored a decided gain this year. They are being continued by all who have used them in the past and have been newly adopted by such makers as Pontiac, Nash, Pack-



Sectional view of "semi-centrifugal" clutch. The circle at the outer end of the clutch lever is the centrifugal mass

ard (120) and Hupmobile (518). In the past, mechanical emergency propeller shaft brakes as a rule were combined with hydraulic service brakes, but in some of the newer applications of hydraulic brakes the rear-wheel brake shoes are applied mechanically through the intermediary of cams by means of the brake lever, thus making a separate emergency brake unnecessary.

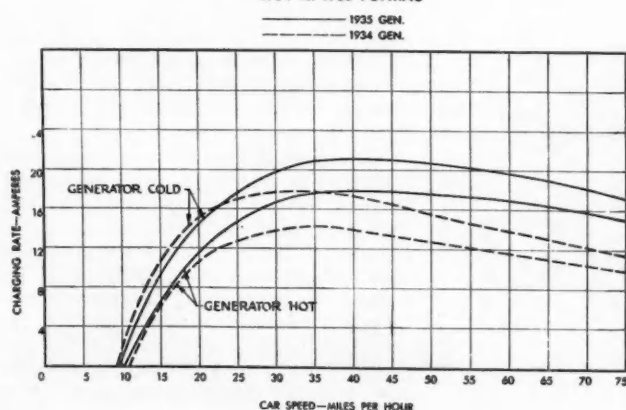
Hupp now has vacuum power brakes on the larger models, while Chrysler has discontinued power brakes as a standard feature on some models.

Independent front springing has been introduced this year by Studebaker and Packard (on the new 120). The former uses leaf springs, the latter coil springs. Independent front suspension by means of coil springs was dropped by Dodge and Plymouth but was adopted on the Chrysler Airstream eights and on the De Soto Airstream six.

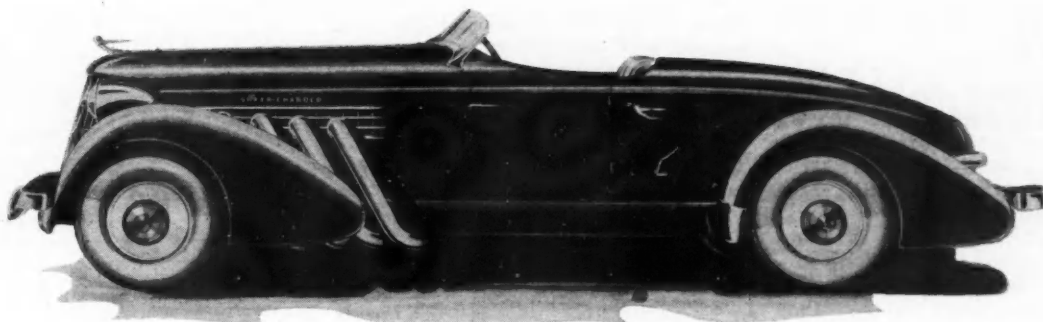
In nearly all cars in which the conventional system of front springing has been retained the use of softer springs and the placing of more load upon them by shifting the powerplant forward have combined to materially lower front spring rates and periods, making them substantially equal to rates and periods of rear springs. It was for the same objective, of course, that independent springing was first introduced in this country. As far as the use of soft springs with conventional suspension is concerned, it was formerly believed that flexible front springs would make steering uncertain, but apparently the problem has been satisfactorily solved. Among those who have softened their front springs are Ford, Plymouth and Dodge. Ford also moved

(Turn to page 50, please)

COMPARISON OF GENERATOR PERFORMANCE
1934 vs. 1935 PONTIAC



This graph of charging rate vs. car speed illustrates the increase in generator capacity



Auburn's new supercharged speedster

New Supercharged Auburns Are Certified to Do 100 M. P. H.

IN addition to the six and eight-cylinder models introduced last September, the Auburn Automobile Company in 1935 will produce six supercharged models with a certified speed of 100 m.p.h. These cars, with a wheelbase of 127 in., are powered with Lycoming straight eight engines with a rating of "upward of 150 hp."

The supercharger is of the centrifugal type and is friction-driven. It is geared to six-times crankshaft speed and is said to be capable of a sustained speed of 24,000 r.p.m.

A sectional view of the supercharger and its driving mechanism and a photograph of the latter are reproduced herewith. The drive is a planetary assembly in which the driving elements are in frictional contact and transmit the driving torque because they are preloaded. The outer ring is held stationary and the spider, which is shown at the center of the photograph, is the driving member. In this way a step-up ratio is obtained which is equal to one plus the ratio of the diameter of the outer ring to the diameter of the

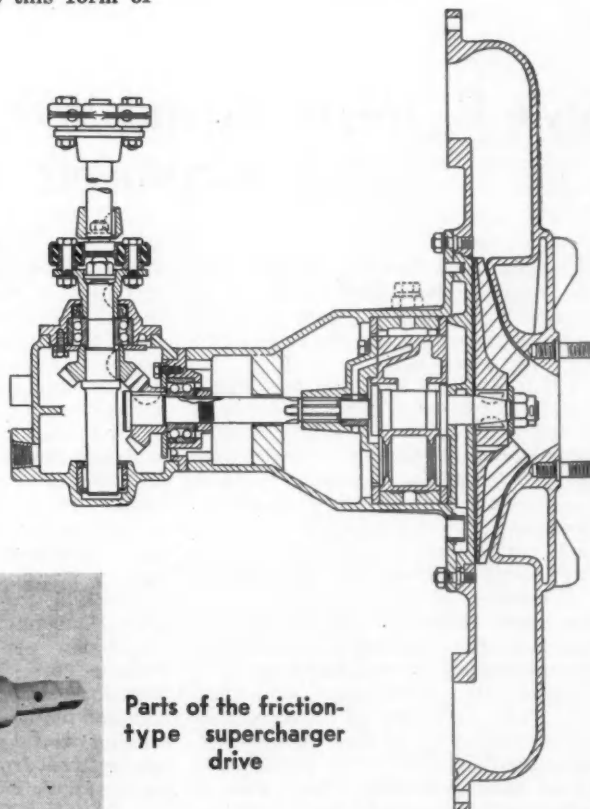
center spindle. In this particular design the step-up ratio of the planetary mechanism is 5 to 1.

Pressure lubrication is provided in the driver, as clearly shown in the sectional view, to provide an oil film between the roller and the driver. The driver is made of an aluminum alloy.

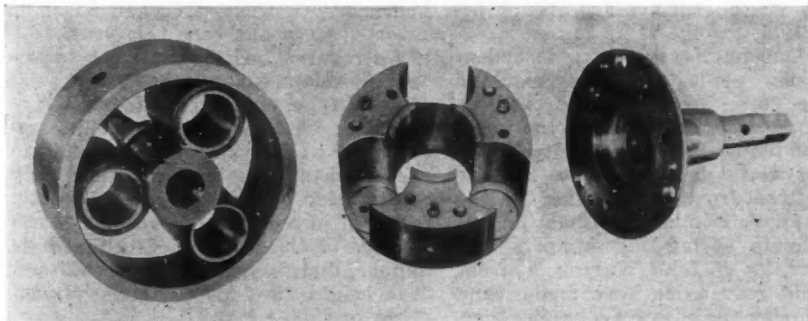
We are informed that this form of

driving mechanism has been found very efficient and—what is even more important—silent in operation. The additional speed-up of 1.2:1 is obtained by means of the chain drive at the front end of the engine, making the

Section through supercharger and drive



Parts of the friction-type supercharger drive

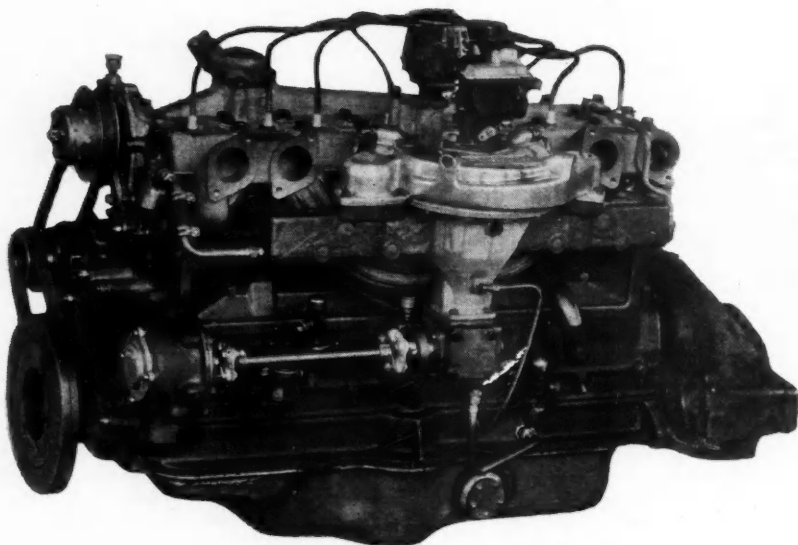


total step-up from crankshaft to impeller shaft 6 to 1.

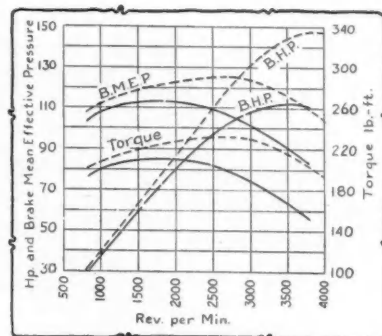
Leading the new line is a torpedo-type speedster model with exposed exhaust pipes. Fenders are of the air stream type, while the rear end of the body comes to a point in torpedo style. Running boards have been dispensed with and passengers step directly into the car from the pavement. Exhaust gases are discharged through four outside pipes covered with 3-in. flexible polished stainless steel tubing, that extend out through the hood and turn

down under the chassis, where they connect with the muffler. The roadster-type top disappears in a compartment directly behind the seat, leaving the body lines unbroken.

Chromium plate is used profusely. The louvers are crossed by four longitudinal chrome bars; headlamps, wire-wheel disks, radiator ornament, fender rear edging, bumpers and rear fender plates are also in chromium finish. The latticed-type radiator grill is in polished aluminum, while bright chromium finish is used on the windshield frame



The new Auburns are powered by a supercharged straight eight Lycoming engine developing upwards of 150 hp.



Torque, B.M.E.P. and horsepower curves of engine with supercharger (dotted) and without

and on the side ornaments.

Several color combinations are available. One is a soft apple green with straw-shade striping. Upholstery is in full-top grain leather in a cream color. Another option is a combination of Valentine-red body, gold-strip trim and natural-color top grain leather upholstery. In still another combination the body is cigarette shade, with the upholstery in dark brown imported glove kid.

More conservative in appearance are the four-door sedan, the two-door brougham, and the two-passenger coupe. The line is completed by a convertible 5-passenger phaeton sedan and an all-weather cabriolet.

Style Refinements and Weight Redistribution Among Major Developments in New 1935 Models

(Continued from page 48)

the spring from directly over the front axle to a certain distance in front thereof, which enabled him to lower the powerplant and the center of gravity of the whole car.

It is interesting to watch how public interest shifts from one component of the car to another. For a long time it was centered on the engine, which was improved from year to year to increase its output per unit of weight or of displacement. The introduction of four-speed transmissions with two silent drives about 1928 and the development of a number of automatic transmissions about the same time caused interest to shift to transmissions, and an immense amount of work has been done on transmission development since that time. The adoption of independent front springing by leading makers last year caused interest to be focused on springs and springing. This year a number of important improvements have been made in chassis springs.

One of the improvements in leaf springs consists in finishing the side

subjected to tension by road shock by grinding. This is based upon the finding of British research on plate springs, that the endurance limit of spring plates as to fatigue failure can be materially increased by removing surface defects. It would probably have taken a good deal longer for this result of scientific research to exert an influence on commercial practice had it not been for the fact that the introduction of independent front suspension focused public attention on springs and springing. Most coil springs are ground before coiling for the same reason.

The Dubonnet system of independent suspension, as used on Chevrolet and Pontiac cars, has been improved by providing better oil seals on the housing and increasing the capacity of the bearing through which the load is transmitted from the housing to the wheel-spindle crank. Nash has adopted the Silenite spring-leaf dampers and anti-squeaks of John Warren Watson.

Hypoid rear axles have made some gains during the past year, having been

adopted by Chrysler on the Airstream Eight (and being continued from last year on the Airflow), and also for the new Packard 120, in line with previous Packard practice. Body heights are still being decreased, and the hypoid axle permits of lower floor heights than the conventional spiral-bevel-gear axle without resorting to the expedient of providing a tunnel in the floor for the propeller shaft. Provision of the tunnel is an alternative to adopting either hypoid-gear or worm-gear drive when bodies are to be lowered and has been resorted to in one case this year.

As regards bodies, the most important development of the year, aside from changes in outside form, is undoubtedly the metal roof. Until recently it was considered impossible to prevent drumming in an all-metal body construction, but this problem evidently has been solved now. Not the least advantage of the metal roof is that it is thinner, and for given "over-roof" and floor heights it adds to the headroom of the car.

Foreman Has Key Role in Maintaining Harmonious Relations with Employees

"WHEREVER there was unrest in the plant," Arnold Lenz, assistant manager of Chevrolet foundries, said in a paper before the recent convention of the American Foundrymen's Association, "it could be traced to the foreman almost without exception. Some were incapable of transmitting management's policies to the employees under them because they were in ignorance as to these policies, disregard them, or were outright disloyal.

"The complaints from the men brought to light a lot of petty persecutions, and favoritism. We also found that a few foremen were actually organizing their departments for outside unions, and as a whole they acted as a complete insulation between upper management and the workers. Legitimate complaints to the foremen were in most instances ignored, but if the complaint was carried higher the complainant was usually subjected to a lot of persecution on the part of the foremen.

"To clear up this situation we called meetings of all foremen, general foremen, and superintendents and discussed with them the rights of employees, and especially those pertaining to Section 7-A. We impressed upon the foremen that their position was the first step in management, and as a direct link between employees and management it was absolutely necessary that they be loyal. We also requested all foremen who had joined any labor organization to either resign as foremen and step back into the ranks, or turn in their union cards. The following week over 40 foremen resigned from the A. F. of L. who then charged discrimination, but our stand was sustained by the Labor Board.

"Since many of our foremen were promoted to their positions through their mechanical ability, we found a great number who lacked even the most basic principles in the management of men. To supply this deficiency we prepared a course of instructions covering all the essentials of good management, and illustrating the application or misapplication by actual cases that were being brought to us directly from the employees through meetings with the Works Council. About 1100 executives of our Flint plant took the course, and the result was almost immediate. Today very few departmental complaints are brought to upper management because the foremen now receive complaints in a spirit of cooperation which has also eliminated passing the buck, and petty lying at the expense of upper management. The employees have

responded to the extent that where six months ago one outside union claimed a membership of around 10,000 men in our plant, they can now muster a bare 100 members.

"My experience in meeting with the Works Council has, as a whole, been quite gratifying. The men have appreciated my willingness to meet with them, and giving them an opportunity to present their problems directly to top management, and in return I have been able to get a lot of information given me in confidence, and having full authority in all plant matters, I could comply or refuse their requests on the spot and give an adequate explanation of my action. I found the representatives very much interested in management's problems and very reasonable once they understood our own limitations.

"Meeting with representatives of out-

side unions has, however, not brought the same results. So far they have concerned themselves chiefly with matters pertaining to union activities usually in the presence of several professional organizers who are more interested in recognition by the management than in anything that might improve the condition of their members in the plant. Frank discussion has not been possible so far, and the few attempts on my part have always been used to further their end by distorting the conversation to a point where it would discredit the management.

"We are quite satisfied after the experience of a little over a year that collective bargaining and frank discussion with employees can be a benefit to both sides providing the meetings are confined to all employee representation, free of outside domination and agitation."

Berryloid Zinc Chromate Primer

FOR automobile collision and refinishing jobs where prevention of rust or corrosion is more important than slightly increased cost there should be interest in a new quick drying metal primer, Berryloid Zinc Chromate Primer, developed by Berry Brothers to meet U. S. Navy specifications for a corrosion inhibiting primer for use on metal surfaces of naval aircraft. The characteristics make the product really a universal primer. It is said to adhere firmly to any metal surface, whether highly polished or rough, whether of dural, aluminum, steel, or cadmium plated. The exceptional corrosion inhibiting ability is due chiefly to the nature of the pigment, finely ground zinc chromate, which is carried in a vehicle consisting chiefly of synthetic resins. The resins or gums used were selected to provide greater durability than possessed by the materials in conventional oil base or pyroxylin base primers, being less affected by light, dampness, salt water, oil, temperature changes and other influences which cause even-

tual failure of primers after varying periods of severe service. Eight years of research and experiment are said to have preceded the introduction of this primer, which is now used by several prominent airplane builders for both military and transport aircraft.

Toluol is the recommended thinner to reduce the consistency for spraying, or for brushing on small surfaces, one to two parts thinner being used to one part primer. Special thinner is supplied when parts are to be dipped. Drying is so rapid that finish coats may be sprayed over the zinc chromate primer in emergency within a few minutes, much more quickly, it is said, than with conventional oil base primers. For best results in production a drying time of several hours is recommended in order that the coating may harden completely, or parts may be baked at temperatures up to 350 deg. F. Properly applied, the coat is so smooth that no sanding is required.

Do Diesels Threaten Balance

COINCIDENT with the momentum acquired by the diesel engine in truck transportation, there has arisen some apprehension in various quarters as to effect of this development on the general fuel oil picture.

On the one hand, petroleum refiners are concerned lest this movement affect the economic balance now existing in the production of fuels; on the other, engine builders and prospective users of diesel transportation are as much concerned about the future course of diesel fuel prices as the availability of such fuels.

From our contacts with this field we feel that much of this apprehension is unfounded and that whatever logic there may be in one viewpoint or another is often based upon generalities unsupported by at least reasonable statistics. Consequently, we propose here to present a statistical approach to the probable course of automotive diesel development, sub-

ject always to judgment factors but predicated on substantial facts.

We shall show that the total probable market for the automotive diesel in truck transportation, neglecting the effect of industrial applications and dismissing the possibility (for the time at least) of dieselized passenger cars, amounts to about 1 per cent of total vehicle registration, although in units it implies a market of 161,000 vehicles.

Our estimates show further that if all motor trucks within a given capacity rating were to be dieselized 100 per cent, the net shrinkage in gasoline consumption would not exceed 4 per cent of current gasoline consumption.

It appears too that under the defined conditions, the added demand for fuel oil of the distillate type should not exceed 13 per cent of the present usage of distillate fuels of all description.

These estimates do not appear to vision an alarming change in the economic picture of petroleum refining and marketing; and they may be rather reassuring to those concerned with the development and

use of diesel power. At any rate, we base our analysis of the situation upon the more secure foundation of statistical facts rather than sheer judgment.

As many of our readers know, the writer presented at the fifteenth annual meeting of the American Petroleum Institute held at Dallas, Tex., in November, a paper entitled, "Outlook for the Automotive High-Speed Diesel Engine in Heavy-Duty Transport." The object was to define the total probable market for the diesel engine and its effect upon the fuel structure. Since the paper is now a matter of record we shall make no effort to discuss pro and con the economic forces at play in this development. However, we refer you to Table 1, given here, which is taken from the API paper. This shows that by conservative estimate the probable market for the automotive diesel is represented by a group of vehicles of 2½-ton rating and upward, comprising less than 1 per cent of total vehicle registration.

If all the vehicles in this category were to be dieselized 100 per cent, which in itself is not a reasonable assumption, would this change be of any great moment to the petroleum industry?

Discussion of the paper at the convention brought out the reasonable query, "How much gasoline does this group of vehicles consume and how much fuel oil will it require?" This question may not be answered off-hand nor will any answer suffice except one couched in terms of barrels of fuel. And it was not answered on that occasion.

After some study of the problem we have found a tangible approach through certain published data. One of the most valuable studies in this direction is found in a report, "Taxation of Motor Vehicles in 1932," which was published in *Public Roads* for October, 1934, a publication of the U. S. Department of Agriculture, Bureau of Public Roads. Although this study was made in 1933 and reflects 1932 statistics, its conclusions may be safely applied in our case, since the trends vary but little from year to year.

TABLE I

Summary of Motor-Vehicle Statistics

1933 total registration motor vehicles	23,827,290
1933 total registration motor trucks	3,226,747
Percentage trucks 2½-ton capacity and up (of total)	5
Estimated number of trucks in service, 2½-ton and up	161,000
Estimated yearly increment of trucks, 2½-ton and up	20,000
Percentage 2½-ton and up of total motor vehicles	0.7
(Based on "Automobile Facts and Figures," 1934 edition.)	

of Petroleum Fuel Markets?

by Joseph Geschelin

Engineering Editor, Automotive Industries

The chief conclusion with which we are concerned is the statement that, "Motor trucks and tractor trucks comprising 13.1 per cent of all vehicles registered in 1932 paid 24.7 per cent of gasoline taxes." Now if we make the assumption that the usage of gasoline varies in direct ratio to fuel taxes, the motor truck as a class uses $\left(\frac{24.7}{13.1}\right)$ times as much fuel as the passenger car, i.e., 1.9 times as much, or practically double.

Suppose we apply these relations to current conditions. According to an estimate released recently by The Travelers Insurance Co., the estimated registration of motor vehicles for 1934 is about 25,000,000 units; and the estimated gasoline consumption is placed at 16.5 billion gallons. If we apply approximately the same percentages as above, motor trucks in 1934 will have burned about $16,500,000,000 \times 0.247$ or 4,075,500,000 gal. of gasoline.

Consider now the portion of the truck market which may economically be dieselized, that portion which we have specified as being 5 per cent of truck registration. Suppose that we assume for the sake of discussion that this 5 per cent uses actually 15 per cent of the gasoline burned by motor trucks as a whole. Then this category, potential dieselized equipment, will have consumed in 1934 a total of about $4,075,500,000 \times 0.15$ or 650,000,000 gal. of gasoline, in round figures.

If this entire category were to be dieselized, the net shrinkage in gasoline consumption might be 650 million gal. or in percentages of the market, $0.247 \times 0.15 = 0.037$ or 3.7 per cent.

That's the net effect on the gasoline market. What happens to fuel oil? So far as we can learn from available data gathered in operations all over the world, the dieselized vehicles operate with 35 to 50 per cent

less fuel by volume than similar gasoline-powered vehicles. If we say for the sake of comparison that 40 per cent is a good general average, then these vehicles if dieselized should require 60 per cent of 650 million gal., or 390 million gal. of fuel oil. In round numbers this corresponds to a demand for 9,300,000 barrels (42-gal. barrels) of fuel oil.

It is interesting to see what this means in terms of the present fuel oil market. According to published figures, the total sales of distillate and residual fuel oil in 1933 amounted to 316,000,000 barrels (42-gal. barrels). Of this, the volume of the several grades of distillate, largely used in diesel engines and domestic oil burners, was 72,000,000 barrels (42-gal. barrels).

Thus, the added demand for diesel fuel due to truck operations would be 9,300,000 barrels, as estimated

above, which may be expressed as

$$\frac{9,300,000}{72,000,000} \times 100 = 13 \text{ per cent.}$$

We prefer to leave the economic significance of these figures to the petroleum industry which, obviously, is in better position to appraise them in a true light. To an outsider the percentages of shrinkage in gasoline volume as well as the increase in demand for distillate fuel oil do not seem particularly large.

Finally, we should like to reiterate several of the recommendations which we made to the American Petroleum Institute:

(Turn to page 59, please)



Problems in the Development of

Part One Part two will appear in an early issue

THIS is to be history rather than an instruction book. The engine to be considered is an eight-in-line with a bore of 3 1/16 in., a stroke of 4 1/4 in., and a piston displacement of 250 cu. in. It met the original requirements of performance and life without an undue amount of development work. What was accomplished by later development work, from the performance standpoint, is shown in Fig. 1.

be obtained by calculating the drop in pressure for each 10 deg. of rotation,

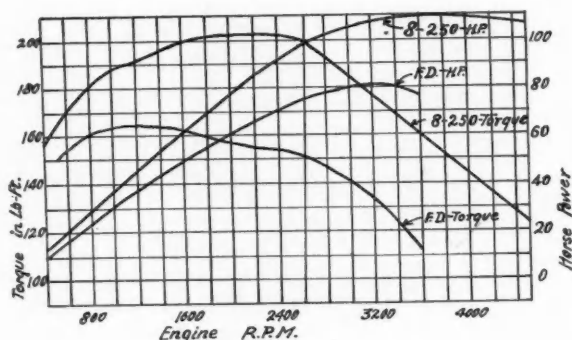


Fig. 1—Torque and horsepower curves of the original engine (FD) and the latest model (8-250)

The F.D.—as it was called in its youth—had a maximum torque of 164 lb.-ft. and a b.h.p. of 81. The 8-250—as it is now known—gives 202 lb.-ft. of torque and 110 b.h.p. In conjunction with the increase in performance, the permissible speed for continuous operation was increased from 3600 to 4500 r.p.m., the latter figure being based on the ability of the engine to operate for 50 hours at full load without shedding any vital parts.

Engine power depends upon the weight of charge taken in during the suction stroke, and an orthodox method of increasing power is to increase the lift of the valve and the duration of opening. Fig. 2 shows that little change was made in the closing point of the intake valve, as tests had demonstrated that a later closing would cause a loss of torque at low speeds. The importance of early intake opening is apparent from a consideration of the suction stroke. As the piston moves down from top center there is an increase in the volume above it and the charge expands to fill this greater volume. The pressure falls as a result of this expansion and the difference between this pressure and the pressure in the inlet manifold governs the rate of flow into the cylinder. An increase in volume of more than 100 per cent results from the first 50 deg. of rotation of the crank, whereas the last 50 deg. produces an increase of less than 15 per cent. An idea as to how this suction effect varies during the stroke can

Increase in Volume

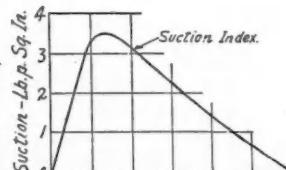
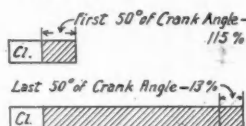


Fig. 2—Valve-opening diagrams of the two engines and diagrams bearing on the variation of the suction with the point of the stroke

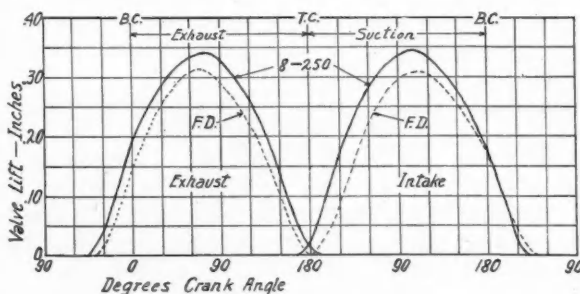
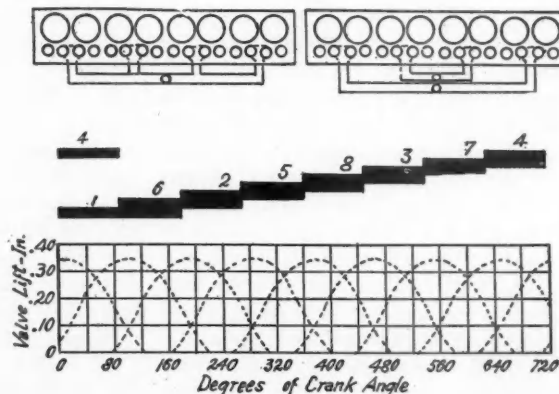


Fig. 3—Showing sequence and overlapping of suction strokes



assuming the valves to be closed and the pressure to be atmospheric at the beginning of each 10-deg. interval. To be sure, this is only one of the factors governing flow, but it is a factor which becomes of increasing importance as compression ratios are increased and clearance volumes correspondingly reduced.

A further increase in power was obtained by replacing the single manifold by a duplex. In effect the duplex manifold consists of two independent induction systems, one of which supplies cylinders 1, 2, 7 and 8, while the other supplies 3, 4, 5 and 6. As shown in Fig. 3, with the single manifold, the suction strokes overlap by 90 deg. How this permits certain cylinders to be robbed of a full charge is brought out more clearly in Fig. 4. Compression pressures, as obtained normally with a single manifold, are plotted in the lower portion of the figure. With the same manifold the duplex construction is approximated by closing the ports in cylinders 3, 4, 5 and 6 while measuring pressures in cylinders 1, 2,

of a High-Speed Engine*

7 and 8 and then closing the ports in the end cylinders while measuring the pressure in the central group. Cylinders 4 and 5 benefit most from the duplex construction, which indicates that these were penalized most by the single installation. A glance at the firing order diagram reveals the reason: Only cylinders 4 and 5 are followed immediately by another cylinder on the same side of the vertical branch.

Valve timing and manifold areas must be matched to take full advantage of the ramming effect which results from pulsations in the intake system. The significance of this will be apparent from Fig. 5 in which the compression pressures at various speeds are plotted for all cylinders. Up to 2800 r.p.m. compression pressures are higher with the carburetor and manifold in place than they are when the charge is taken directly into the intake ports. Hence the "ramming" effect furnished by the carburetor and manifold more than offsets the restriction which they offer.

Fig. 6 is included as an exaggerated picture of what takes place in the normal manifold. In these experiments the charge for cylinders 5 and 6 was taken through long manifolds mounted on the common port. Under conditions of minimum restriction—namely with no manifold at all—the maximum pressure was 136 lb. per sq. in. With a

by Stanwood W. Sparrow

Engineer, Research Dept.,
Studebaker Corporation

48-in. manifold, not only was the maximum increased to 152, but in addition there was an increase in pressure as the speed was increased from 2500 to 4500 r.p.m. From the results shown in this figure it seems fairly obvious that the booster action of the intake manifold is an "organ pipe" effect rather than a simple ramming due to the inertia of the charge in the intake pipe.

With the generous intake passages essential to a high power output, gas velocities during full load operation at slow speeds are extremely low. Hence the manifold must be provided with considerable heat to vaporize the fuel, as satisfactory distribution of liquid

cylinders which get the most liquid are those which received the most sand and showed the most wear.

Fortunately the liquid distribution in this engine was not bad enough to cause difficulty in starting, and the problem of liquid distribution after starting is solved—or avoided—by the application of sufficient heat to convert the liquid into vapor. Excessive heating is prevented by a thermostatically controlled, unbalanced valve which shunts the exhaust gases away from the hotspot during full-load operation at medium

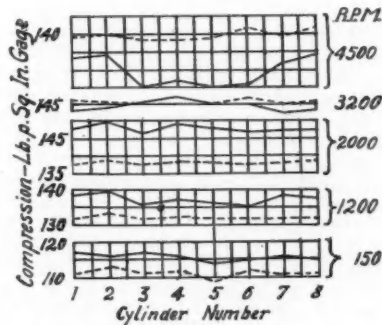


Fig. 5—Compression pressures of individual cylinders at different speeds

Full lines:—Compression with manifold and carburetor
Dotted lines:—Compression without manifold and carburetor

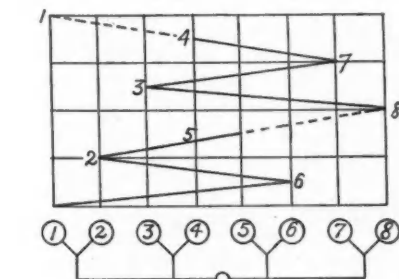


Fig. 4—Diagram of firing order and chart of compression in individual cylinders at 3200 r.p.m., with a single manifold

is a difficult problem. A curious example of distribution was furnished by an accelerated wear test in which sand was allowed to enter the intake. The wear of the piston rings in cylinders 2, 4, 5 and 7 was approximately twice as great as that of the rings in the remaining four cylinders. In this engine, pairs of cylinders are fed from common ports and the vents are not equally spaced. For example, the suction stroke in No. 1 cylinder begins 180 deg. before the suction stroke in No. 2 cylinder and 540 deg. after the previous suction stroke in No. 2. In every case the greater wear occurs in the cylinder in which the suction begins at the time the suction stroke in the companion cylinder is being completed. Liquid, like sand, is heavier than air, and distribution tests show that the

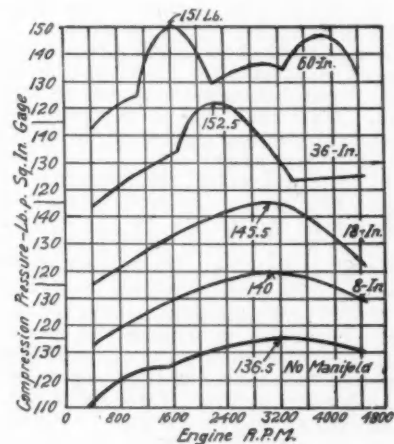


Fig. 6—Effect of length of exhaust pipe on compression pressure

and high speeds. With a downdraft manifold, such as is now used on this engine, the problem of distribution immediately after starting is somewhat more difficult than with the updraft construction, but the attention given to the solution of this problem is more than justified by the greater ease of starting obtainable with the downdraft. In addition, the downdraft usually permits a more favorable location of the carburetor intake and is to be preferred from the standpoint of engine accessibility.

The increased performance of the present engine may be credited in part to the fact that the compression ratio has been increased from 5.1 to 6.3. Some increase in ratio was made possible by the general availability of fuels of higher anti-knock value. A further increase was permitted by a change in combustion chamber design and by the adoption of aluminum as a cylinder-head material. The change in material by itself enabled the compression ratio to be raised from 5.5 to 6.3 without any sacrifice in the factor of safety against

*Paper presented before the Cleveland Section of the S.A.E. Slightly condensed.

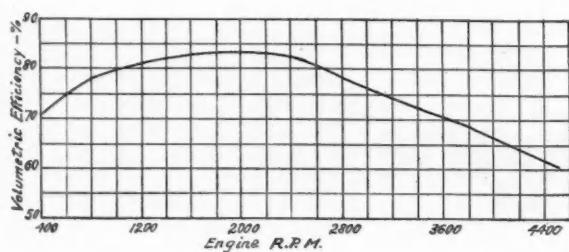


Fig. 7—Typical volumetric efficiency curve

detonation. Spark plugs with a high resistance to fouling can be used in the aluminum head without danger of pre-ignition.

The attention to be given to problems arising in connection with high engine speeds should not be interpreted as a failure to appreciate the car owner's desire for high acceleration at low speeds. On the contrary, it is a recognition of the fact that increasing the safe operating speed of an engine is one of the most effective ways of improving the low speed performance of a car. For instance, a top car speed of 85 m.p.h. may necessitate an axle ratio of 4 to 1 if the engine speed is not to exceed 4000 r.p.m., but if an engine speed of 4500 r.p.m. is permissible it becomes possible to use an axle ratio of 4.6 to 1 and as a result the acceleration at low speeds is increased by more than 16 per cent. This is due in part to a greater multiplication of torque and in part to the fact that at low speeds the torque of the engine increases as the speed is increased.

After looking at a characteristic curve of volumetric efficiency like that of Fig. 7 one naturally asks why the effort expended in improving engine reliability at high speeds might not be employed more profitably in bringing the volumetric efficiency at 400 r.p.m. up to the value now obtained at 2000 r.p.m. It is common experience to find that low speed performance is sacrificed by changes in valve timing which increase maximum power. This has led to the belief that in the low-speed range volumetric efficiencies of nearly 100 per cent might be obtained if it were possible to change the timing to suit each particular speed. A little thought will show that such is not the case. Heating of the charge is a major cause of low volumetric efficiency and its influence is most pronounced at low speeds. For example, in one engine dropping the temperature of the jacket water from 160 to 80 degrees Fahrenheit increased the volumetric efficiency at 400 r.p.m. by 20 per cent but made less than 3 per cent difference at 3200 r.p.m. Even if a kind fairy donated an intake system with no restriction, and the charge entering the cylinder was heated only to the jacket-water temperature of 170 deg., the volumetric efficiency with an entering air temperature of 70 would not exceed 84 per cent,

$$(460 + 70) / (460 + 170) = 0.84$$

In fact, with most engines the volumetric efficiencies obtained at low speeds are as high as it is reasonable to expect and the high values which are found at certain speeds are due to pulsations in the intake system.

An old spark-plug ad describes the ignition spark as "a gas-blasting blaze of withering heat that gives your motor the heart of a charging grizzly bear."

For the sake of accuracy it must be admitted that at high speeds the spark more often resembles a "feeble firefly fluttering to the last round-up." In general the sparking voltage becomes less as the speed is increased, because of the shorter time available for satu-

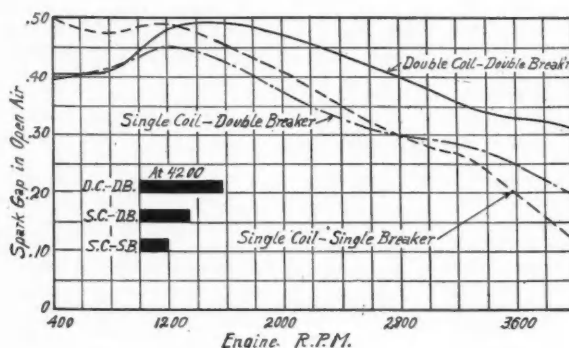


Fig. 8—Length of spark gap in open air at which missing is first noticed, with different ignition systems

rating the coil. Several examples of this will be found in Fig. 8. The open air gap was placed in the normal spark plug location in order that engine conditions might be duplicated as regards vibration, length of wire, etc. Naturally, the ignition system selected from these three (Fig. 8) was that which provided an adequate factor of safety with the least cost. For the 8-250 engine the single coil, double breaker system fulfilled this requirement. A satisfactory criterion of an adequate factor of safety is the ability of the engine to operate without missing or loss in power with clean spark plugs

having a gap of 0.050 in.—more than double the normal width.

Firing at the wrong time because of induced sparks is a trouble which has become increasingly prevalent with the trend toward higher compression ratios. The occasional "low-speed buck" encountered in full throttle acceleration is likely to be due to induced sparks. In a recent dynamometer test, intermittent—and very sharp—pings occurred in No. 7 cylinder. These were traced to induced sparks caused by the high-tension lead between the coil and the distributor. To remedy this, the high tension lead was brought in at the top of the distributor instead of at the side as in the original installation. In seeking more definite information relative to the prevention of these induced

sparks a dummy lead was placed parallel to the wire between the coil and distributor. The engine was operated normally and, although the dummy lead had no connection with the ignition system, the index plug showed continuous sparking as long as the insulated coverings of the wires were in contact. With the wires separated by $\frac{1}{8}$ in., sparks occurred at intervals of 4 seconds and a separation of $\frac{3}{8}$ in. eliminated the induced sparks entirely. An alternative solution consists in the use of grounded armored cables, but this has the disadvantage of reducing the voltage of the spark plugs.

Dimensional Formulae for Thermal Units

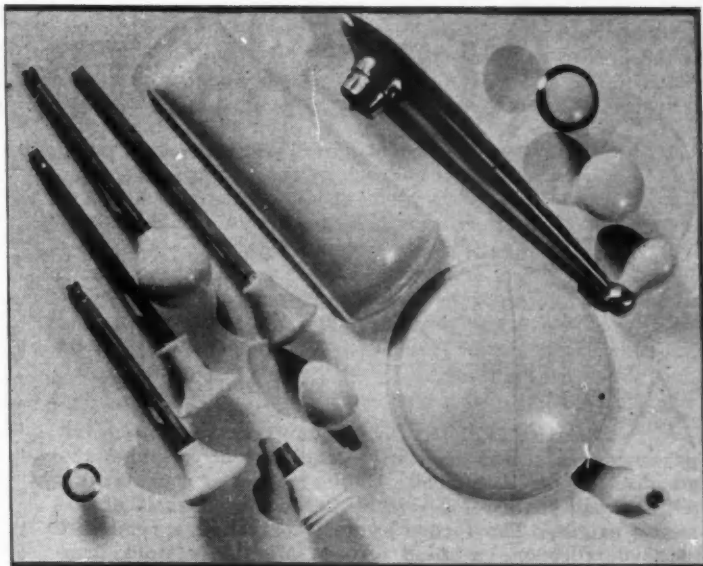
THERE has been a good deal of discussion regarding the possibility of expressing the various thermal units in terms of the three fundamental units of length, mass and time. All mechanical units, of course, can be readily expressed in terms of these fundamentals, and the electrical units also give no trouble, but so far it has been impossible to evolve a system for heat units that is entirely beyond criticism.

It has been suggested that, since the energy of a volume of gas is proportional to its mass and its absolute temperature, and energy has the dimensional value $M L^2/T^2$, the absolute temperature has the dimension L^2/T^2 , which is equivalent to V^2 (velocity squared). This would

give thermal conductivity the dimension M/LT , while quantity of heat, of course, would have the same dimension as energy, viz., $M L^2/T^2$. Specific heat, entropy and the gas constant R are dimensionless units in this system.

The weakness of this suggestion seems to lie in the fact that the absolute energy of a mass of gas depends not only on its mass and its absolute temperature, but also on its specific heat. Of course, if we assume the specific heat to be dimensionless, then the absolute temperature takes the dimensional value of L^2/T^2 , but what justification is there for assuming specific heat to be dimensionless?

Urea Plastics in Automotive Construction



These ivory Plaskon knobs and fittings for automobiles will never become darkened with age, and are practically immune from cracking and chipping

UREA plastics, of which Plaskon, a type developed in this country, is an example, share many of the advantages of the phenolic materials. In addition, they have advantages of their own which account largely for their use in automotive applications. Chief among these advantages is their availability in white and light pastel shades. These light hues are as permanent as the dyes used in producing them and do not darken with age. Although the

tinted colors have not found extensive application in automotive vehicles as yet, they may do so as styles in color change in the future. White and ivory Plaskon is extensively employed in automobile body fittings at present and may well find wider use.

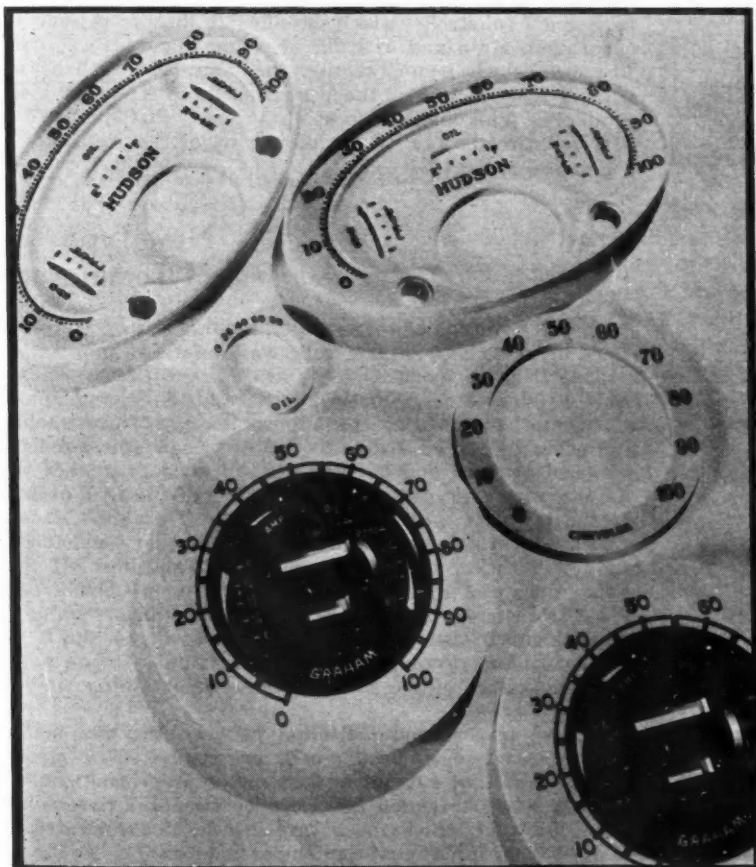
Of almost equal importance with color in urea plastics is their availa-

bility in translucent form especially in certain important applications in body and instrument-board construction.

The translucency of the white and ivory colored ureas accounts for their growing use as dials on instrument boards, where they take the place of glass, and as dome-light covers or lenses where they have also displaced glass on some large-production cars. Light passing through molded urea used in items of this type is well diffused and free from glare and the products themselves, though not actually unbreakable, of course, are not easily broken and are far less fragile than glass and also much lighter.


By the use of translucent urea dials, the latter are rendered readily visible by transmitted light at night. The white and ivory also contrast well with black scales and figures and stand out well in reflected light in the daytime. The transmitted light passing through urea dials is soft and well-diffused and does not create glare from instrument-board lighting. Ureas in such applications have thus solved a rather difficult problem in instrument illumination. Urea dials can also be formed readily with holes through which the instrument-hand spindles may pass and with other holes, if desired, for fastening the dials to the instrument board.

Urea plastics can be used, of course, for shades or lenses in other interior lights than those mentioned and has
(Turn to page 59, please)



Instrument board fixtures of Plaskon permit the light to shine *through* them, giving a diffused light that does not interfere in driving. The black numerals show perfectly on the ivory background in the night as well as in the daytime

AUTOMOTIVE ABSTRACTS

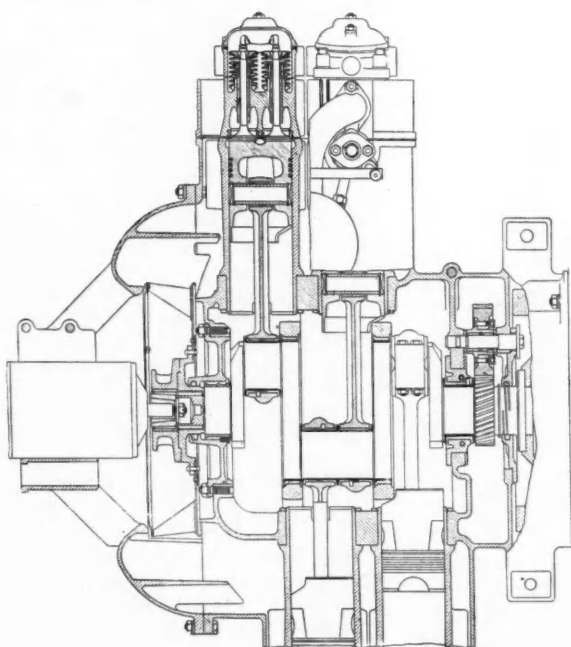


Panhard Wins Gas Generator Test

A COMPETITION for suction gas generators on passenger cars was held in France recently, under the auspices of the Automobile Club of France, concurrently with a road contest for vehicles operating on fuels of domestic origin. The former contest comprised a road test of 2300 miles and a speed test on Monthlery track over 310 miles. A first prize of 100,000 francs (\$8,680) was offered by the Minister of Agriculture and a second prize of half that amount by the Minister of War. Only three cars completed the test. The winner was a Panhard equipped with a six-cylinder sleeve-valve engine which attained a speed of 55 m. p. h. and had a consumption of 128,986 calories per 100 km. (8230 B.T.U. per mile).—*Omnia*, September.

New Krupp Air Cooled Diesel Truck Engine

THE Krupp air-cooled Diesel truck engine represents quite a departure in commercial vehicle engines. It has a barrel-type crankcase and a three-throw crankshaft supported in four main bearings, the two intermediate bearings



being on the outside of circular crank webs and stepped, so that the crankshaft may be inserted from the end. Bore and stroke are 3.62 x 5.12 in., giving a displacement of 211 cu. in., and the output is 48 hp. at 2300 r.p.m. The fuel injection pump, of a special horizontal opposed pattern (and of either Bosch or Deckel make) is bolted to the crankcase cover. Fuel nozzles are mounted vertically in the detachable precombustion chambers which are screwed

into the cylinder barrels from the top. The crankcase assembly consists of five aluminum castings.

Individual cylinder barrels are employed, each piloted in the heavily bossed crankcase, and the square flange is provided with four long studs which project into the interior of the crankcase. Three main parts of aluminum alloy comprise the cylinder-head assembly. The cylinder-head casting, with valve seat inserts, is threaded over four long studs in the upper flange of the cylinder barrel and is drawn down by the second casting which forms the casing for the overhead valve rockers and springs. Both castings are finned. To avoid the possibility of damage to the relatively deep cylinder-head fins projecting to the front and rear, the edges of these fins are joined by an integral wall, the smooth outer surface of which forms a continuation of the cowling extensions of the crankcase. The third casting is a simple inspection cover which encloses the rocker gear. There are no fins on the upper and lower faces of the cylinder heads, which carry flanges to which the air intake pipe and the finned exhaust pipe are attached.—*The Automobile Engineer*, September.

Compact Diesel For Marine Service

THE rapid development of fast patrol boats and similar craft in England has led to a demand for compact engines having a high power to weight ratio. Up till now this demand has been met mainly with gasoline engines, but Diesel engines are now being developed to meet the requirements. Glennifer Engines, Ltd., of Glasgow, have recently brought out a 12-cylinder V type of their oil engine, of 6 in. bore and 7 in. stroke, which develops 20 hp. per cylinder at 900 r.p.m. Main and articulated connecting rods are used. The crankshaft is underslung, the main-bearing bolts extending from facings in the V right down to the bearing-cap retainers. This makes it possible to use a cast sump which is bolted directly against the main part of the crankcase.—*Engineering*, Sept. 21.

New Type of Torsiograph

A NEW type of torsiograph, making use of the properties of the photo-electric cell, was described in a paper entitled "New Methods of Mechanical Measurements—Mean-Pressure Indicators, Torsiographs, and Accelerographs," which was presented to the French Society of Automobile Engineers by André Labarthe. If a disk of spiral outline is placed on each end of the shaft, of such form that the radius vector is proportional to the angle of rotation, around the shaft, and if the disk is used to cut off a parallel beam of light, a variation of the flux of light proportional to the angle of rotation of the shaft studied is obtained. If this variable beam of light is directed onto a photo-electric cell, an electric current is obtained whose instantaneous value is proportional to the momentary rotation of the shaft. A second identical arrangement, placed at some other point along the length of the shaft, permits of obtaining similar results.

If there is torsional deflection between the two points and if the two photo-electric cells are connected in opposition, the resultant current at any instant is proportional to the momentary torsional deflection between the two points of the shaft at which the obturating disks are located.—*S.I.A. Journal* for August-September-October.

Traffic Noises In England

THERE has been much complaint about traffic noises in England recently, and the British Association for the Advancement of Science, whose annual meeting took place during the first half of September, appointed a committee with Sir Henry Fowler as chairman to see what could be done in the way of noise reduction. Sir Henry had written to *The Times* inviting reasoned opinions from the public as to which particular noises they found most disagreeable. From the answers received it appeared that the noises of passing motorcycles were found most objectionable; but other offenders were automobile horns and aircraft. The Committee therefore decided to concentrate on the exhaust noise from motorcycles. At the meeting a paper on The Reduction of Exhaust Noise of Motorcycles was read by Wing-Commander T. R. Cave-Brown-Cave, a paper on Instruments for the Measurement of Noise by Dr. Davis of the National Physical Laboratory, and a paper on Automobile Horns by a representative of a manufacturer of these devices.

Wing-Commander Cave-Brown-Cave in his paper described experiments made on exhaust mufflers on motorcycle engines in which the manufacturers of motorcycles collaborated. To separate the exhaust noise from noises of the engine mechanism the engine was installed in a compartment separated from the laboratory by a brick wall.

The type of muffler found to be most effective in reducing the high-pitch part of the noise was one based on the absorption principle. Tests showed that so long as the diameter of the external casing was about twice the diameter of the pipe, there was no appreciable advantage in using a larger ratio. It seemed that the greater the length of the absorption passage the greater would be the absorption of noise; and since the available length on the motorcycle is limited, a muffler was made in which the exhaust gas, after passing the full length, turns forward again and then back to the tail end, thus giving about three times the length of travel through an absorption passage. The change of direction at each end was effected in a chamber which constituted a small capacity introduced between successive absorption passages. The results obtained with this silencer were most satisfactory.—*Engineering*, Sept. 21.

Urea Plastics in Automotive Construction

(Continued from page 57)

gained considerable use also as knobs for instrument-board controls and for handles in which the ivory and other colors available present pleasing possibilities and smart contrasts with other interior trim. Knobs for window regulators and gear-shift levers are also made from this material with pleasing results and its use might well be extended to vanity cases and ash-receivers. The latter, however, should have metal trays, as a lighted match or cigarette may blister and discolor the surface of a part molded from urea. The material will withstand any temperature normally encountered in automotive applications and is non-inflammable. It is also resistant to water, oil, alcohol, gasoline, and most common solvents. It is readily cleaned, and without injury, by soap and water, and is not easily stained.

In common with other molding resins, the urea type is mixed with a filler. Wood flour, such as is often used with phenolics, gives transparent ureas a mottled appearance, however, and since this is avoided with a paper or cellulose pulp filler, the latter is generally employed, especially as its light color is advantageous and takes the dyes, which are used in coloring, in such a way as to give a uniform color and translucency.

In respect to strength and to most other physical properties the ureas are about the same as the phenolics in which similar fillers are employed. For Plaskon, physical properties are as follows:

Specific gravity, 1.48.
Modulus of rupture, 10,000 to 14,000 lb. per sq. in.
Compressive strength, 25,000 to 30,000 lb. per sq. in.
Tensile strength, 6,000 to 10,000 lb. per sq. in.

Impact strength (Charpe), 0.7 to 1.2 ft. lb. $\frac{1}{2}$ x $\frac{1}{2}$ -in. bar.

Puncture voltage, 300 to 400 volts per mil.

Hardness, Scleroscope, 80 to 95.

Water absorption, $\frac{1}{8}$ -in. section at 20 deg. C., 0.012 to 0.120 grams per sq. in. in 24-hour immersion.

From the foregoing it is apparent that the established urea plastics, all of

which are very familiar so far as utility and most physical properties are concerned, have characteristics which suit them well for several automobile applications. Designers and others concerned with automobile styling will do well to keep the advantages of the urea plastics in mind when changes in design and appearance are under consideration.

Do Diesels Threaten Balance of Petroleum Fuel Markets

(Continued from page 53)

1. That since diesel fuel is the controlling element in the development of the field for the automotive diesel, steps must be taken to survey the commonly available fuels and develop acceptable specification fuels having wide distribution and general utilization in engines now on the market.

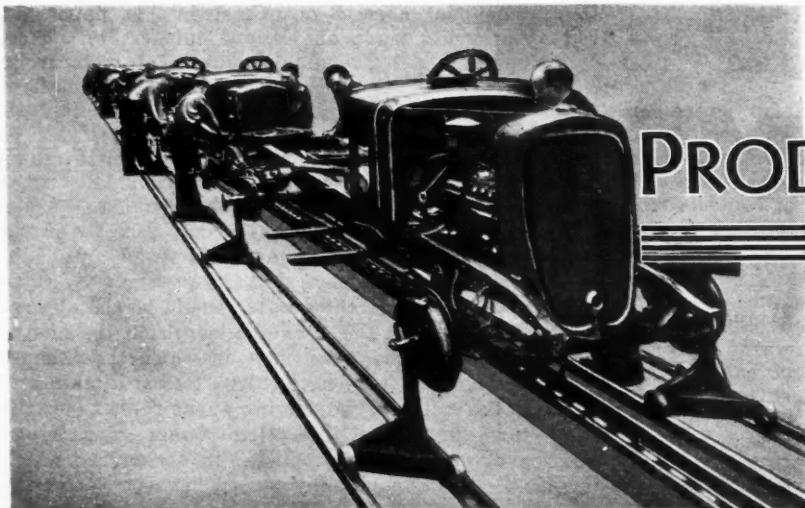
2. That petroleum refiners should take the initiative, select acceptable fuels, and submit the specifications to diesel engine manufacturers and the large users.

3. That the best interests of everyone concerned would be best conserved if the petroleum industry would undertake this work in time to anticipate the writing of specifications by the user groups.

Initiative on the part of the petroleum industry is the key to the situation. The automotive diesel has gained such great momentum that

it will carry on despite any obstacles that may come up. And if the many organizations participating in the movement travel independently and without direction, we may be faced with a trying situation—the problem of individual preferences and individual specification fuels. This can only result in confusion and undoubtedly will bring up many serious problems of distribution and fuel cost.

It may be of interest to note in passing that recently we have talked with several representatives of progressive oil companies who told us that they were working on specification fuels and would be in position to announce them during the course of the next few months. Unquestionably these organizations will be in an enviable position so far as their relations with prospective customers are concerned.



PRODUCTION LINES

Cemented Carbides

Just a few days ago we received a bulletin on cemented carbides which impressed us as being one of the finest handbooks published in many a day. It's put out by Prosser, makers of Widia tools and tips, and contains in brief but comprehensive form much of the information available on the utilization of hard tool materials. It covers the logical applications of Widia, analysis of commercial grades, notes on tool design, grinding procedure, applications of modern metal cutting theory, and much more of practical import to the production man. To say it is an excellent handbook is but faint praise. We like it immensely and recommend it to our friends.

About Grinding

Another fine contribution to the art of production grinding is a handbook, "Grinding Wheel Information and Selection," just released by the Norton Co. It is a genuine treatise on the subject of wheel selection, covering abrasives, structure, bond, etc. And winding up with a section on specific recommendations for stated operating conditions. Be sure to bring your shop library up to date by getting a copy of this handbook.

Compensation

Add to the literature on unemployment insurance, a valuable compendium of various plans entitled, "Facts About Unemployment Compensation." It was prepared by the Committee on Social Legislation of the National Conference of Business Paper Editors. Note the use of the term "unemployment compensation" rather than insurance—a point well

taken in the light of facts. This brochure gives the background information as well as the probable course of legislation in this country during the next sitting of Congress and the State legislatures. A copy will bring you up to date on this topic of the hour. Price 10 cents per copy.

Hardest Material

Grits and Grinds, Vol. 25, No. 5, carries the complete story of the development and manifold applications of Norbide—Norton Boron Carbide, B.C. It is particularly valuable for the extrusion of abrasive materials and is used in extrusion dies, thread guides, pressure blast nozzles, etc. This copy of the *Grits and Grinds* may be of great interest to you.

Hard Faced

The feed cam on an automatic screw machine in a plant manufacturing automobile parts lasted under normal conditions for a period of from 6 to 12 weeks. The edge of this cam was then hard-faced for its entire length to a depth of $\frac{1}{8}$ in. tapering to $\frac{1}{16}$ in. on the smaller end. The cost of hard-facing this part was one quarter that of a new cam, while its life was extended to one year.

Aircraft Noise

It's the opinion of some prominent aircraft experts that the noise associated with aircraft operation is a serious drawback in more ways than one. For example on several occasions some very worthy landing field projects were killed because of the

opposition of the citizenry in the vicinity. Most of the noise is attributable to the engine and propeller. And because the latter is the most serious offender little effort has been made to silence the engine. When viewed from the broad perspective, the problem is one decreasing the noise rather than finding ways and means of insulating the ship's passengers from the noise.

E-P Lubes

Talked to a man the other day who is developing an E-P lube entirely different in principle from those now on the market. Little can be said about it while the basic patents are pending, but we can tell you all about it in a few months.

Experimenting

Current knowledge of engineering materials and methods is penetrating even unaccustomed fields. Take license tags for example. We mentioned recently the use of aluminum plates in several States. Now we learn from *The Parkerizer* that the sheet metal plates in Michigan and several other States will be Bonderized in 1935 to preserve the finish and prevent rusting.

For Safety

Linde Air Products has just issued a pamphlet on the precautions and safe practices in the storage, care and handling of oxy-acetylene welding and cutting equipment. It's a concise but thorough treatment of this important element of plant operation and should be of great value to factory executives. The company will gladly provide you with copies of this pamphlet.—J. G.

MANUFACTURING
MANAGEMENT
METALLURGY

"Hold-Heet" Pyrometer Lance

The Russell Electric Company, 346 West Huron Street, Chicago, Ill., is now offering a pyrometer of the portable or lance type at \$16.00. Meters are available for three different temperature ranges of 800-1600-2500 F.



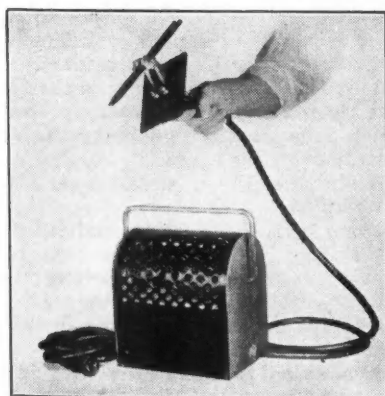
The instruments are of the low resistance type, thereby combining high accuracy with rugged construction. The protecting case and handle is a single aluminum casting.

These portable hand instruments will serve for checking temperatures in all the applications where a wall type pyrometer is used. For general use it has the additional advantage of portability. It is recommended as an exploring instrument to gather heat data in chemical and industrial processes, as a "trouble shooter" and as a check tester in existing pyrometer installations.

The equipment is useful for checking each melt of non-ferrous metals to insure that they are poured at the proper temperature. The instrument is invaluable for checking oven and furnace temperatures, salt and oil baths, heat treating machines and processing equipment. Special types of thermocouples are available for different applications, including a silver disc contactor for quickly exploring surface temperatures.

Roffy Torch Has Double Purpose

ELECTRIC TORCH MFG. CO., 5321 E Horton St., Oakland, Calif., has placed on the market the Roffy auto-



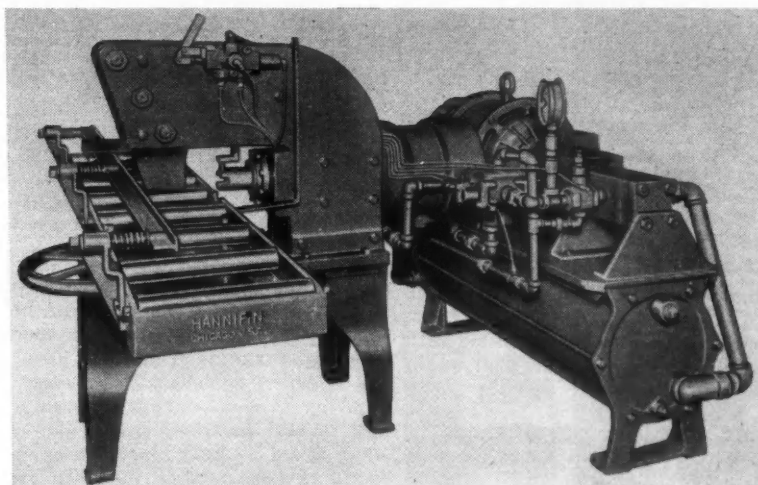
matic arc torch and welder which is an inexpensive high temperature unit,

NEW DEVELOPMENTS

Automotive Parts, Accessories and Production Tools

Hydraulic Riveting Press

A prominent tractor manufacturer recently installed a special 50-ton hydraulic riveting press, shown in the illustration, for heading several rows of $\frac{3}{4}$ -in. hot rivets on track frames for crawler type tractors. This completely



self-contained hydraulic riveting machine was designed and built by the Hannifin Manufacturing Company, Chicago, Ill.

The work is advanced between the dies on a roller bearing equipped conveyor. The conveyor is adjustable vertically so as to bring the various rows

of rivets into alignment with the dies. The riveting cycle is completed automatically when the operator moves the starting valve lever. When this lever is moved the ram advances, first actuating a pressure pad, and continued movement heads the rivet; after a momentary dwell on the rivet under full pressure the ram automatically re-

verses, and then upon completion of the reversal the hydraulic system idles at no pressure. The maximum working pressure is 1600 lb. per square inch and may be reduced for heading smaller rivets. Maximum ram travel is $5\frac{1}{2}$ in. The press is equipped with a 10-hp., 900-r.p.m. motor.

simultaneously a stable torch and an efficient welder designed to be operated on ordinary house lighting circuit.

When used as a welder for sheet iron, steel, stainless steel and cast iron the metallic arc welding process is followed. When used as a torch with bronze brazing, phosphor copper welding, soldering, aluminum welding, hard surfacing with tungsten alloys, melting and general heating, the double carbon electrode Joblekov candle flame is used. When used as a single carbon electrode for spot welding, puddling cast iron and lead, the familiar direct carbon arc to metal is used.

The Roffy torch will develop a temperature in excess of 7000 deg. F. at between 4000 to 5000 B.T.U. at the tip of the electrodes, per hour, and is rated at 2 K.W. It is said to successfully weld up to ten gage sheet metal without any previous preparation, or by beveling up to $\frac{1}{4}$ in., and in round

stock if properly beveled up to $1\frac{1}{2}$ in. dia.

New Surface Treatment of Concrete Floors

Stonhard Company, Philadelphia, Pa., has perfected a surface hardening treatment for concrete floors that is said to possess many advantages over former methods.

Stonhard concrete surface treatment not only penetrates concrete floor surfaces to weld the cement and aggregate into a solid mass, but it is also a vehicle for a solid that fills and seals the surface pores, eliminating entirely the pockets that hold disintegration agents. An abrasive test on floors that have received the treatment gives evidence that a floor so treated will withstand wear 162.5 per cent better than an untreated floor.

NEW DEVELOPMENTS

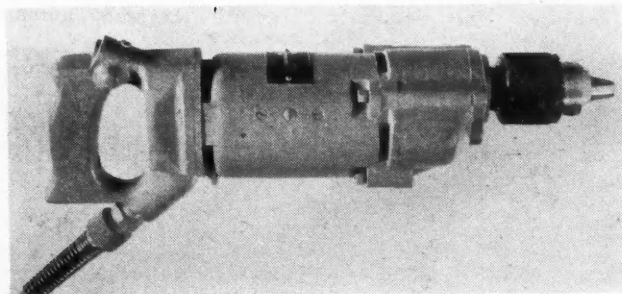
Automotive Parts, Accessories and Production Tools

Hercules High Frequency Drill

The Buckeye Portable Tool Co., Dayton, Ohio, has placed on the market a new Hercules high-frequency electric

the spade-handle design illustrated.

The specifications are: Three-phase, 180 cycles, 225 volts (also 110); speed, 800 r.p.m.; capacity, $\frac{3}{8}$ in. and light $\frac{1}{2}$ in. drilling; $\frac{3}{8}$ -in. Jacobs chuck; overall length, 15 $\frac{1}{4}$ in.; weight, 10 $\frac{1}{2}$



drill, the No. 31. It is equipped with the new Hercules cool running high-frequency motor, and is obtainable with side handle and switch, as well as in

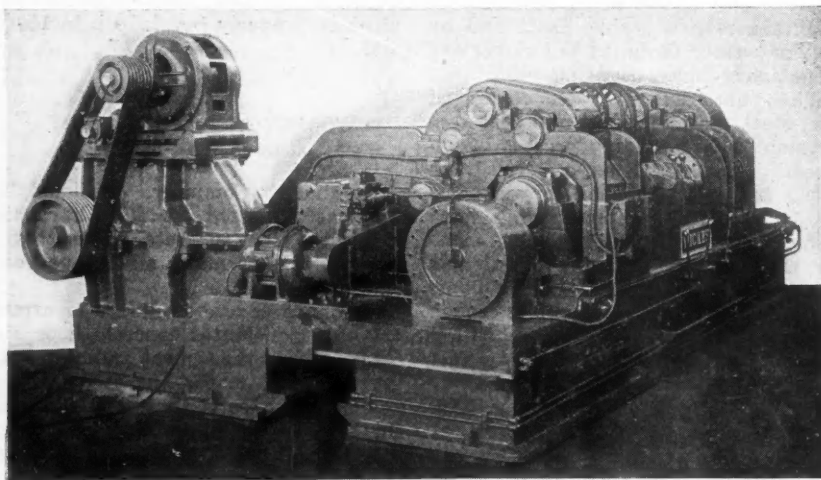
lb. Other drills of the same type construction as the No. 30 will be furnished in various sizes to meet demands.

New Crankshaft Turning Equipment

Wickes Brothers, Saginaw, Mich., have developed a new line of crankshaft turning equipment. The attached photograph shows the machine used for simultaneously turning the counters on the 12 crank arms of a six-

close-up of the tooling layout shows that the shaft is supported on the three center bearings by means of roller rests. The lathe is built very ruggedly for machining of particularly hard shafts, the one illustrated having a Brinell of 385.

Drive is through a 30-hp. constant speed motor to a speed reducer with separate motors for the hydraulic



throw, seven-bearing crankshaft, taking first a roughing cut and immediately thereafter a fine finishing cut. The

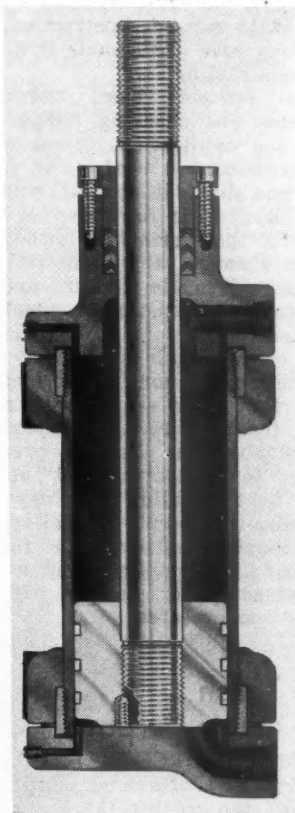
pumps and cooling compound feed. The base of the machine is steel and of welded construction, being built up of

1 $\frac{1}{2}$ in. and 2 in. cross rolled steel plates.

A similar machine is used for simultaneously turning the 24 chamfers on the crank arms. These machines have been shipped to the Moscow Airplane Motor Plant, U.S.S.R.

Double Acting Hydraulic Cylinder

A new line of double-acting cylinders for high-pressure hydraulic service has recently been introduced by the Hanfin Manufacturing Company, Chicago, Ill. While only one type of mounting is illustrated, cylinders are available in numerous types and in a wide range of sizes, with practically any length of stroke required. The standard models are designed for work-



ing pressures up to 1500 lb. per square inch; in addition, special cylinders can be furnished for higher pressures.

A feature of this cylinder is the fact that tie rods have been entirely eliminated, thus greatly enhancing the appearance of the product besides improving its ability to function satisfactorily in high-pressure service without leakage. Another feature claimed for this design is that cylinder caps can be removed without disturbing the mounting, thus facilitating replacement of gaskets and rendering the internal parts more readily accessible.

In addition to being furnished in a variety of types and sizes, these cylinders are also available either with a small diameter piston rod or with a 2 to 1 differential of the piston area.

The Udylite Rheostat

For all electroplating processes, The Udylite Company, Detroit, Mich., has designed and built a rheostat into which are said to be incorporated the features of close current regulation, ruggedness, compact construction and simplicity of operation.

The Udylite cam switch is designed

holds each leaf perfectly flush against the bus bar without distortion. Pressure is always perpendicular to the contact surface.

Ammeter and voltmeter are of the highest quality obtainable and were carefully selected. They are securely fastened on the front of the board in full view of the operator. The am-



to provide perfect contact at the low plating voltages. This perfect contact is ensured by grinding the switch leaves when the switch is in a closed position. Ample contact surface and current carrying capacity have been provided. The contact pressure firmly

meter shunt is located below the resistors, away from heat, ensuring reliability of instrument readings. A double throw, single pole, voltmeter switch is mounted on the rheostat to permit reading of the voltage drop across the tank and across the line.

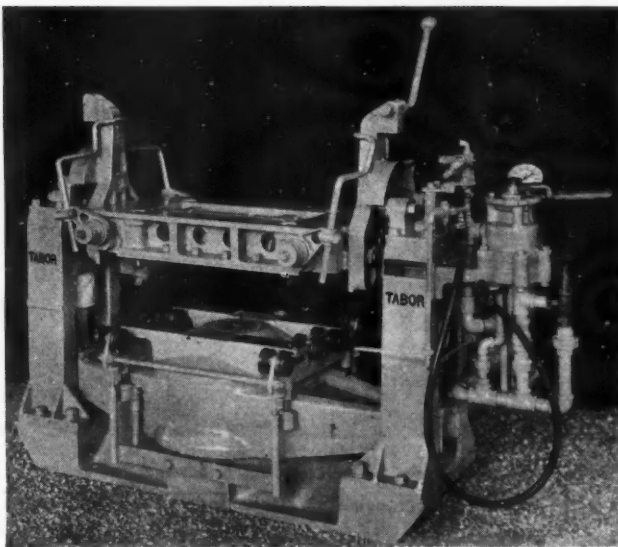
Tabor Molding Machine Built in Three Sizes

The Tabor Mfg. Co., Philadelphia, Pa., has just brought out the Tabor Semi-Shockless-Jar, Hand Trunnion Rollover, Gravity Draw Molding Machine. In the 15 in. size the machine has a table 33 in. x 16 in., a squeezing cylinder 15 in. diameter and a jarring capacity of 500 lb. It is built in three

either end. These bushings have over six diameters of guide on heavy 2 in. fixed guide rods.

The table must be lifted free of the trunnions before jarring. This is done by the squeezing piston which is automatically held against fixed stops at the proper height. The jarring machine is supported on air during the jar. There is no downward shock on the floor.

The machine is equipped with quick-



sizes, with 13 in., 15 in. and 18 in. squeeze cylinders.

Mounted rigidly on the squeezing piston is the jarring head which also is a cross-head carrying bushings at

acting air-operated flask clamps. The table rolls on rollers, this type of construction being employed by Tabor in automotive foundries for the past eight years.

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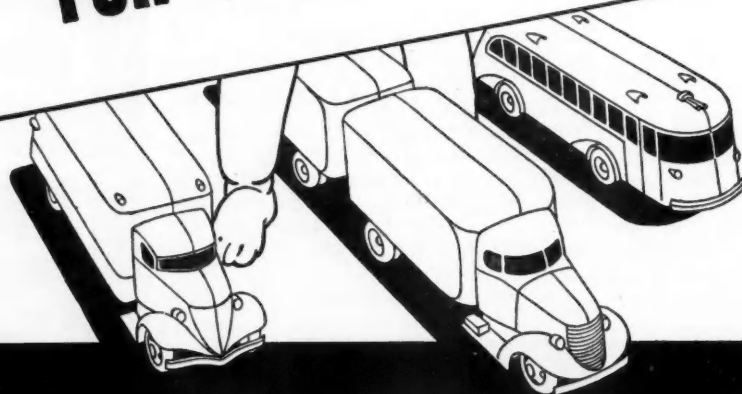
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